KU LEUVEN

FACULTEIT PSYCHOLOGIE EN
PEDAGOGISCHE WETENSCHAPPEN

Centrum voor Professionele Opleiding en Ontwikkeling
en Levenslang Leren

Integration and differentiation

The impact of educational regimes at secondary level on equity and social mobility in comparative perspective

Jeroen Lavrijsen

Proefschrift aangeboden tot het verkrijgen van de graad van Doctor in de Pedagogische Wetenschappen

Promotor: Prof. dr. Ides Nicaise

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SUMMARY

This dissertation considers how the design of secondary education affects the outcomes of different groups of pupils on different time horizons. Educational systems have to resolve a permanent dilemma between differentiation (as students differ and society requires different profiles) and integration (as schools have to provide all students with strong common foundations for life in a complex society). Chapter 1 discusses how different answers to this dilemma have given rise to different educational structures across countries and times, differing in aspects such as the age of first selection and the development of vocational education.

The four following chapters examine empirically how different designs influence outcomes over the entire 'life cycle' of pupils. Chapter 2, which has been published in the *European Education Research Journal*, explores the effect of tracking regimes on social inequality in reading proficiency at 15 years, using data from PIRLS (2006) and PISA (2012). The diff-in-diff-analysis suggests that countries that track pupils at an early age display stronger effects of social origin on achievement, net of differences existing already before the onset of tracking. In particular, early tracking negatively impacts on the educational opportunities of socially disadvantaged students, while it does not seem to affect their more advantaged peers.

Chapter 3, which has been published in *European Education*, considers how macro-level determinants influence social inequalities in school dropout. Using data from the Labour Force Survey Ad Hoc Module (2009), a multi-level analysis shows that educational system design matters: a well-developed vocational education segment reduces school dropout, while early tracking is associated with a larger effect of parental background. However, the strongest generator of social inequalities in school dropout comes from outside the school system: children from low-educated parents are far more likely to drop out when poverty is high. Social inequalities in educational attainment are thus not only a result of the way the educational system functions, but also of socioeconomic inequalities outside the reach of schools.

Chapter 4 then shifts the attention to longer term effects of education, in particular labour market careers. Comparing the employment probabilities and earnings of vocational and general education graduates in PIAAC (2012), with differences in selectivity kept under control, vocational programmes are shown to secure relative safe pathways into the labour market. However, for older respondents, vocational education seems to lose some of its value. This age pattern can be related to the lower emphasis that vocational education puts on the development of foundational skills: a too narrowly designed initial education may hinder graduates to successfully adapt to changing labour market needs through lifelong learning.

Chapter 5 examines how the design of the educational system affects the formation of attitudes towards learning. Cross-national differences in the average readiness to learn of adults, as measured in PIAAC (2012), suggest that strong external differentiation mechanisms, in particular tracking students at a young age and relying extensively on grade retention, lead to less positive attitudes towards learning. While scrutinizing these cross-sectional observations by taking attitudes measured in primary school (PIRLS and TIMSS) into account confirms the overall effects, a number of methodological issues call for further investigation.

Based on these findings, Chapter 6 concludes with a number of policy suggestions to further improve the educational system currently in place in Flanders.

SAMENVATTING

Dit doctoraat bestudeert de effecten van de vormgeving van het secundair onderwijs op de uitkomsten van verschillende groepen leerlingen en op verschillende tijdshorizons. Onderwijssystemen opereren binnen een voortdurend dilemma tussen differentiatie (inspelen op verschillen tussen leerlingen en op uiteenlopende maatschappelijke noden) en integratie (elke student een stevige basis meegeven om te kunnen functioneren binnen een complexe maatschappij). Hoofdstuk 1 gaat na hoe landen uiteenlopende antwoorden op dit dilemma hebben geformuleerd, met belangrijke verschillen in de onderwijsstructuur tot gevolg, bijvoorbeeld voor wat betreft de leeftijd waarop leerlingen worden gesorteerd en de manier waarop het beroepsonderwijs is uitgebouwd.

In de volgende vier hoofdstukken ga ik telkens empirisch na wat de effecten zijn van deze ontwerpkeuzes, zowel op korte als op langere termijn. Hoofdstuk 2, dat gepubliceerd werd in *European Education Research Journal*, onderzoekt op basis van gegevens uit PIRLS (2006) en PISA (2012) hoe een vroege sortering de sociale ongelijkheid in de leesvaardigheden van 15-jarigen beïnvloedt. De diff-in-diff-analyse, waarbij gecorrigeerd wordt voor verschillen die zich al in het basisonderwijs voordoen, suggereert dat de impact van sociale achtergrond groter is in landen met een vroege sortering. In het bijzonder heeft een vroege sortering een negatief effect op de leesvaardigheid van kansarme jongeren, terwijl het geen effect lijkt te hebben voor hun kansrijke leeftijdsgenoten.

Hoofdstuk 3, dat gepubliceerd werd in *European Education*, bekijkt vervolgens hoe landkenmerken de sociale ongelijkheid in het vroegtijdig schoolverlaten bepalen. Een multi-level analyse op basis van gegevens uit de Labour Force Survey Ad Hoc Module (2009) laat zien dat het onderwijssysteem er toe doet: een goed uitgebouwd beroepsonderwijs vermindert de schooluitval, terwijl een vroege sortering de samenhang met de sociale achtergrond versterkt. Toch lijkt de belangrijkste verklaring buiten de schoolmuren te liggen: de sociale ongelijkheid in de schooluitval is het grootst in landen met een hoge armoedegraad. Onderwijsongelijkheden zijn dus niet alleen het gevolg van de manier waarop het onderwijssysteem zelf is ingericht, maar ook van de socio-economische context waarin de scholen opereren.

Hoofdstuk 4 verlegt de blik naar de langetermijneffecten van onderwijs, in het bijzonder de arbeidsmarkt. Door in PIAAC (2012) de tewerkstellingskansen en de verloning van afgestudeerden uit het algemeen en het beroepsonderwijs met elkaar te vergelijken, waarbij verschillen in selectiviteit onder controle worden gehouden, laat ik zien dat beroepsonderwijs een relatief veilige overgang naar de arbeidsmarkt garandeert. Doorheen de loopbaan verdwijnt dit positieve effect echter. Dit leeftijdspatroon zou in verband kunnen worden gebracht met de lagere nadruk op basisvaardigheden in het beroepsonderwijs: een voldoende ruime invulling van de initiële opleiding is nodig opdat werknemers zich later, als de jobvereisten veranderen, vlot zouden kunnen bijscholen.

Hoofdstuk 5 onderzoekt hoe de structuur van het onderwijs de ontwikkeling van een positieve leerhouding beïnvloedt. Op basis van metingen uit PIAAC (2012) lijken afgestudeerden uit systemen met een sterke externe differentiatie, in de vorm van een vroege sortering of een grootschalig gebruik van zittenblijven, een minder positieve houding t.o.v. leren te rapporteren. Terwijl deze cross-sectionele observatie overeind blijft wanneer ze wordt gecontroleerd voor leerhoudingen gemeten in een vroeger stadium (PIRLS en TIMSS, lagere school), nodigen een aantal methodologische beperkingen uit tot voorzichtigheid en verder onderzoek.

Op basis van deze bevindingen sluit Hoofdstuk 6 af met een aantal beleidssuggesties om het huidige Vlaamse onderwijssysteem verder te verbeteren.

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CHAPTER 1 – INTRODUCTION: WHY DO EDUCATIONAL SYSTEMS DIFFER?

In this dissertation, I will study how the design of the educational system influences the outcomes of different groups on different time horizons. I will study outcomes on three different time horizons: short-term effects (skill levels), medium-term effects (graduation probability), and long-term effects (labour market outcomes and lifelong learning participation). Each of these effects will be discussed in a separate Chapter; for each effect, an elaborate overview of theoretical background and existing research will be provided at the start of each Chapter. In this introduction, I will instead focus on the background of the differences in educational systems themselves: how did different countries develop their educational systems, and why are there so many differences in educational system design?

Educational systems: between differentiation and integration

The title of this dissertation refers to integration and differentiation. Apart from being a wink to my own background as a mathematician, I believed it to be an appropriate title because I consider the delicate balance between these two opposing tendencies as the main principle behind educational system design. Indeed, on one hand educational systems have to serve the differentiated needs of different kind of students; moreover, they are urged to acknowledge differentiated demands from society, in particular from the labour market. On the other hand, schools aim at ensuring equal opportunities to all and have to provide all students with strong fundaments for successful lives in an increasingly complex society. Different answers to this dilemma result in different designs for the educational system, giving rise to different educational structures across countries and times.

An early elaboration of this view can be found in the works of the French sociologist Émile Durkheim (1858 - 1917), one of the founders of functionalism, a theory that understands social phenomena in terms of how they are functional to society. Durkheim distinguished two important social needs to be served by the educational system. First, societies need education to imprint their moral and social rules on children, who are considered to constitute a permanent 'invasion of barbarians' into society, in order to assure the stability of and the solidarity within the society. This task calls for a strong common core in the educational system, in which all children are treated more or less equally as future citizens. Secondly, however, there are many different roles to be filled in society, and these roles require different skills and attitudes. This calls for specialization, and thus stratification, in the educational system. Put simply: the

fact that pupils have to become both citizens and workers faces the educational systems with two opposing requirements. In the words of Durkheim (1956), '*Education is the influence exercised by adult generation on those that are not yet ready for social life. Its object is to arouse and to develop in the child a certain number of physical, intellectual and moral states which are demanded of him in both the political society as a whole and the special milieu for which he is specifically destined. Society can survive only if there exists among its members a sufficient degree of homogeneity; education perpetuates and reinforces this homogeneity by fixing in the child the essential similarities that collective life demands. But on the other hand, without a certain diversity all co-operation would be impossible: education assures the persistence of this necessary diversity by being itself diversified and specialized*.' The functionalist perspective has been further developed by scholars such as Parsons (1959), who defined schools '*as agencies through which individual personalities are trained to be motivationally and technically adequate to the performance of adult roles*'.

Skill specificity and stratification

In this dissertation, I will focus on how these opposing requirements are satisfied in secondary education by distinguishing between two dimensions[1] of educational system design: first, skill specifity, and secondly, stratification (Allmendinger (1989); see also Lavrijsen and Nicaise (2013) for a further evaluation).

First, I use the dimension of skill specificity to indicate the dominant orientation in the educational system. Two major options can be identified. 'General' systems are oriented towards supplying broad general skills, seeing preparation for further education as their major objective. Alternatively, 'vocational' systems are mainly oriented towards supplying occupation-specific skills, with the major aim to prepare students (in particular those not deemed fit for further education) for direct entry in the labour market. The difference between both options can be observed by comparing the share of enrolments in vocational education (VET) in secondary school. The distinction is also reflected in the skill structure in the two groups: as vocational education usually acts as a major pathway towards medium level qualifications, the skill structure in general oriented systems is usually more polarized ('islands of excellence in a sea of ignorance').

[1] A third important characteristic is the *governance* of the educational system, which is linked to concepts such as autonomy, accountability, and (quasi-)markets. However, I will pay relatively little attention to governance, as this is the main focus in another dissertation currently under development.

The group of vocationally oriented systems can further be broken down into two subdivisions, according to the design of the vocational tracks and the involvement of the social partners in their provision. In particular, systems in which VET is mainly school-based can be distinguished from systems where it is mainly provided through apprenticeships, i.e. in firms. This then leads to three distinct types of skill specificity (Busemeyer & Trampusch (2012)), each with their own archetypical example: the general skills system of the USA, the dual model of Germany, and the school-based VET model apparent in some other continental-European countries, including Belgium.

While the specificity dimension mainly describes how differentiation is implemented, the stratification dimension covers the extent to which the system differentiates between pupils. The most salient characteristic in this dimension is the presence of early tracking. With 'tracking', I mean here the practice of directing pupils with different abilities via distinct educational trajectories towards different educational and occupational end-points. While all European countries implement separate tracks for pupils above a certain age, this starting age differs drastically: many countries do not track students until age 16, while others, such as Germany, the Netherlands and Belgium, have different tracks starting already at age 10 or 12. Of course, the earlier the tracking starts, the more it influences the educational career of the students involved. However, Dupriez, Dumay, and Vause (2008) have emphasized that the absence of early tracking does not mean that classes are truly heterogeneous. For example, France and other Southern-European countries separate out struggling students via massive use of grade retention. In Anglo-Saxon countries, students can often take courses on different levels flexibly for each discipline (ability grouping). Only in the Nordic countries classes can be considered truly heterogeneous, with differentiated teaching and remediation classes to allow all students to master a similar common core curriculum until age 16.

The concepts of specificity and stratification are correlated, but not identical. General oriented systems are usually relatively unstratified, as most students are in a general track that is not structurally differentiated (though practices like ability grouping can introduce more flexible differentiations). Within the vocational oriented group, however, all combinations of specificity and stratification are possible. For example, the Nordics have succeeded in developing vocational tracks in upper secondary (specific skill type), while sticking to comprehensive structures in lower secondary; moreover, both school-based and dual-based models can be observed. Further note that the onset of tracking does not have to coincide[2] with the onset of specialization.

[2] For example, in Germany tracking takes place at age 10, but the *Hauptschule*, which caters for the academically less inclined, provides only a relatively non-specialized, uniform labour market preparation (*Arbeitslehre*) until age 15/16.

Historical context

In this paragraph, I will provide a short historical sketch of the major developments in educational system design throughout the 20th century. How did educational systems develop to the shapes we observe today? For this summary I will mainly rely on Garrouste (2010). For specific country descriptions, the series edited by Standaert & Wielemans (1996) has been very helpful. The history of education in Belgium has been described in depth by Henkens (2004) and D'hoker and Henkens (2005).

Regarding the stratification dimension, the 20th century mainly tells a story of increasing integration. At the start of the 20th century, almost all educational systems relied on a very early differentiation of students, with schools for lower class and upper class children sharply segmented from each other, even at the primary level. However, this segmentation came under increasing pressure after World War II. The most salient feature of this shift toward integration probably is the 'comprehensive turn' that occurred in the 1960s and 1970s, with schools offering a common core until the end of lower secondary being implemented in many European countries: in Sweden (grundskola), Denmark (folkeskole), UK (comprehensive school), Italy (scuola media), Germany (Gesamtschule), France (college unique), the Netherlands (middenschool), and Belgium (VSO). In spite of this general tendency, however, not all systems were affected to the same degree, and not all reforms had the same success. In particular, the enthusiasm and consensus behind the comprehensive reforms varied between countries. For example, while in the Scandinavian countries the new structure was universally applied (after a series of controlled experiments, in which the effects of the reforms on skills development were evaluated (Heidenheimer (1974) – an early example of evidence-based policy making), comprehensive schooling never surpassed the experimental phase in Germany. In Belgium, the reform didn't make it into universal acceptance either. The set-back came mostly at the end of the 1970s and in the 1980s, when the comprehensive turn was stopped in a number of countries, reaffirming the tracked structure. In other countries, comprehensive structures formally survived but were hollowed out, e.g. by the re-emergence of elite schools (UK) or by the massive reliance of grade retention as a mechanism to re-impose homogeneity (France). In Belgium, the comprehensivation was somewhat diluted into the *Eenheidstructuur*.

The cross-country differences in skill specificity are older and have remained much more stable throughout the 20th century. The most salient difference between the European-continental systems and the American school systems can already be clearly observed in the beginning of the 20th century: Goldin & Katz (2009) show how a majority of American children already enjoyed universal secondary education in relatively undifferentiated High Schools at a time where education in European countries was still sharply segmented. There certainly has been some numerical convergence and cross-country parallelism in enrolment figures into different programs: in most countries, vocational education enrolment

increased during the first half of the century and declined after the Second World War (Benavot (1983)). However, qualitative distinctions, such as the involvement of social partners or the status of vocational education, remained very sharp. For example, Müller and Wolbers (2003) demonstrate how vocational education in Germany has always been substantially different from general education because of its clearly marked occupation-specific *content*, which they contrast with the status of vocational education in France, where it has as its major aim to give pupils of lower general ability the possibility to obtain a qualification and thus distinguishes itself from general education primarily on the basis of its lower *level*. Convergence in enrolment figures thus do not have to reflect any convergence in the logic behind the system. Similarly, Green, Leney, and Wolf (1999) observe that while most countries have increased their reliance on workplace learning in vocational education, this happened mostly because of didactical reasons and did not imply any real convergence towards the dual model of firm-based vocational education.

Explanations for differences across countries and times

The importance of the context in comparative education

To understand the differences in the development of educational systems discussed above, these systems have to be seen in their historical economic, political and socio-cultural contexts. The importance of the context to understand educational phenomena has indeed always been a central tenet in the research field of Comparative Education (Noah & Eckstein (1998), Standaert (2007), Wielemans (2000)). For classic comparative educationalists, '*the essence of a country's educational system is that it is embedded in a particular historical and cultural context*' (King & White (1958)), and as a consequence '*the things outside the schools matter more than the things inside the schools*' (Sadler (1964)). Comparative education thus always has been historical in nature: a thorough understanding of the past was necessary to explain the present. However, this traditional approach came under attack in the second half of the 20th century. The mostly descriptive methods, in which 'comparison' was usually restricted to simply juxtaposing a limited number of countries, too often led to essentialist positions, in which differences between countries were not really explained but rather reduced to fixed differences in 'national identity'. Secondly, because of the '*obsession with the context*' (Cummings (1999)), which was considered unique for each country, little effort was given to more systematic comparisons. The traditional approach thus failed to develop any *general* account of how educational systems developed – and how this might influence their functioning (Noah and Eckstein (1975)).

From the 1960s onwards, comparative education thus (as did other social sciences) started to adopt a more positive methodology, based on quantitative comparisons of measured variables. As articulated by Noah & Eckstein (1969), this paradigm shift tried to move away from the identification of specific national educational characteristics towards a more general framework in which theories about the effects of system characteristics could be tested on the basis of cross-national data. This new approach thus rested on the formulation of general hypotheses, the quantification of the variables in them, and then the performance of statistical tests. As it was famously summarized by Noah (1973): '*The theme of recent work may be seen as a progressive transfer of attention from country-characteristics to problems, and from problems to the specification of relationships and the formulation and testing of theories. The object of the exercise, then, is not, as in traditional comparative studies, to extend and enrich as far as possible, the connotational content of country-names; instead, we seek to extend and enrich to the limit general 'law-like', cross-system statements. A comparative study is essentially an attempt as far as possible to replace the names of systems (countries) by the names of concepts (variables).'*

Strongly relying on a large array of empirical data, this dissertation is deeply grounded in this positive approach to comparative education. At the same time, it acknowledges that the positive paradigm does not rule out the value of a thorough understanding of the broader context, trying to incorporate both positivist thinking and socio-historical sensitiveness (cf. Bell (1962)). To quote Eckstein (1975): '*few researchers today will deny the complementary nature of the approaches that characterize the predominantly historical studies of the 1930s and 1940s and the empirical studies of the past decade.*' As noted already by Bereday (1966), this reinforces the interdisciplinary nature of comparative education: a quantitative study of educational systems in their economic, social and political contexts asks for an integration of insights from very different disciplines. Paraphrasing the quote by the famous British economist Keynes (1924), it could be argued that comparative educationalists *'must possess a rare combination of gifts: he must be mathematician, historian, statesman, philosopher - in some degree. He must understand symbols and speak in words. He must contemplate the particular, in terms of the general, and touch abstract and concrete in the same flight of thought. He must study the present in the light of the past for the purposes of the future. No part of man's nature or his institutions must be entirely outside his regard*.' This, indeed, is precisely what makes comparative education such a fascinating research field.

In the next paragraphs, I will thus try to combine both historical insight and empirical evidence to paint a picture of how we can understand cross-national differences in educational system design[3], paying

[3] I will focus on *general* patterns in educational system design; to understand specific developments in a single country, the importance of practical issues should not be underestimated, as educational policies often have been 'overwhelmed by reality' (Ambler (1987), see also Henkens (2004)).

attention to the economic, political respectively socio-cultural context that has influenced their development.

Functional explanations

The functional explanation for cross-country variation in educational system looks at how the needs of society, and in particular the requirements from the labour market, could differ between countries. For example, Ariga, Brunello, Iwahashi, and Rocco (2005) argue that cross-country differences in educational system design are related to differences in labour market demand for either specialized or general educated employees[4]. This of course only provokes a new question: what then explains cross-country differences in labour market demand? In a milestone contribution, Thelen (2004) traces the origins of different 'skill regimes' back to differences in industrial relations at the beginning of the 20th century. In most European-continental countries, she argues, skill supply was at that time still strongly controlled by the traditional artisanal sector. Employers and trade unions from the developing industrial sectors thus had to work together to break down the grip of the artisanal sector in order to create an alternative channel for skills supply, which gave birth to a strong vocational training sector. In the Anglo-Saxon countries, by contrast, the artisanal sector was less powerful, which made control of occupational skill supply a permanently conflictual issue between employers and trade unions; this gave vocational education, which required the collegiate involvement of both labour market actors, less room to develop.

Furthermore, Estevez-Abe (2001) suggests that this early divergence became reinforced by complementary differences in social protection schemes and economy coordination. She argues that individuals are more reluctant to invest in specific than in general skills, as the advantages associated with the former are tied to a limited number of jobs (only those within a single industry of firm), while the latter are transferable from one job to another. Investments in specific skills thus require some guaranteed 'return on investment'. In coordinated economies such as those from continental Europe, systems of collective wage-bargaining reduce the individual risk of wage depression: even when changes in labour market demands would return a number of jobs less needed, those who were trained specifically for these jobs would still earn a satisfactory wage. Hence, specific skill investments are less risky in coordinated economies than in liberal economies, explaining the deep divergence in skill specifity between continental Europe and the USA. Secondly, the divergence between school-based and firm-based skill provision models within the specific skill type can be related to differences in protective

[4] In this case, the associated benefits of specialization were not traded-off against the need for social integration (as Durkheim would suggest), but rather against the costs of possible misallocations (at an early age, abilities are not yet well developed and cannot be measured without error).

regulations against dismissal: since firm-specific skills are worthless outside the firm, workers will be only willing to invest in such firm-specific skills if they are assured that they can stay in the company for a long enough period. Hence, where employment protection is strong, dual provision models (firm-specific skills) will flourish; on the other hand, where social protection focuses less on protection against dismissal and more on generous unemployment benefits, occupation-specific skills (which may be useful in different firms from the same occupational sector) will be mostly provided in a school-based setting.

Finally, the functional paradigm has also been used to explain historical fluctuations in vocational education enrolment: its increasing popularity during the first half of the century is then related to the growing medium-level technical skill requirements in a context of increasing industrialisation (Benavot (1983)), while the shift towards the tertiary sector has been named as one of the reasons behind the 'comprehensive turn' in the 1960s (Derouet, Mangez, and Benadusi (2015)).

Power resources explanations

A second line of thought objects to the functionalist perspective that educational system design is not simply an objective response to an objective social need, but that design choices instead often were the subject of intense political power struggles. At its most extreme, conflict theory and Marxists views on education then explain stratification in terms of an elite group preserving its position by channelling lower class pupils into lower tracks, thus deliberately reproducing social inequality (cf. Bowles & Gintis (1976), Bourdieu (1974)). However, such static explanations are less helpful to explain the observed differences between countries and periods (Hickox (1982)). A more insightful application of the importance of political power to understand cross-country differences is proposed by Archer (1979), who argues that the degree of centralisation in the educational system reflects the social and political conflicts during state formation, and that this is reflected in the degree of stratification as well: weak central governments facilitate the survival of parallel structures and thus impede a strong integration of the educational system (cf. the grammar schools in England). Similarly, Wiborg (2004) explains differences in stratification between England, Germany and Scandinavia as a consequence of the influence of long-standing social cleavages on the positions of different political actors. In the beginning of the 20th century, she argues, in England or Germany strong social cleavages existed (between the industrial elite and the proletariat resp. between the *Junkers* and the landless farmers), and this led every stratum to create its own schools; accordingly, political representatives felt little interest to defend integrated schools and instead favoured the schools of their electoral bases. By contrast, society in the Nordic countries, where the majority consisted of small independent farmers, has always been more uniform: schools were thus less segmented from the beginning, and this 'common cause' shifted the political stances of different political parties towards more integrationist positions.

While such explanations often refer only to a selected number of countries, a more systematic account of cross-country patterns in educational system design has been inspired by the explanation behind differences in welfare state type, developed by Esping-Andersen (1990). Esping-Andersen traces variations in welfare state design back to the structure of the power relations between the different social classes. In particular, he argues that in countries where the political left was fragmented, state intervention remained limited (Liberal world). By contrast, where the left was strong (mostly due to farmer-workers alliances), it implemented a highly redistributive welfare state (Social-Democratic World); however, where Christian-democracy, which was characterized by a class-cutting constituency, was strong, the emphasis usually shifted from redistribution to insurance. Empirically, welfare state design and educational system design are clearly correlated, with the educational systems of liberal welfare states usually relying on ability grouping, those from conservative welfare states tracking their students at an early age, and those from social democratic welfare states allowing for heterogeneous classes (Hega and Hokenmaier (2002), Allmendinger and Leibfried (2003), Peter, Edgerton, and Roberts (2010), Andres and Pechar (2013)). Busemeyer (2014) and Sass (2015) interpret this correspondence by applying the political resources perspective to educational system design preferences: they argue that left parties will be supportive of educational policies that benefit the lower tail of the educational attainment distribution (where their voters are, on average), while conservative parties will oppose any drastic expansion of educational opportunities because of budgetary reasons and fears for 'expectation inflation' among the working class. Indeed, Braga, Checchi, and Meschi (2013) produce strong historical evidence for this correlation between political power and educational positions. By matching educational reforms from the 1930-2000 period in 24 countries to the prevailing political orientation of government, they demonstrate that educational reforms which reduce the dispersion in educational attainment were indeed implemented mostly by left wing governments, while right wing governments preferred more selective policies. Similarly, a correspondence between political positions and the generosity of public education financing has been reported by Busemeyer and Iversen (2014).

However, the correspondence between political strengths and educational system characteristics should be qualified. For example, Bellaby (1977) argues that support for comprehensive education was strongest not among the lower classes, but rather among the middle classes, as for the latter social mobility seemed more a prospect within reach[5]. Accordingly, Bertocchi and Spagat (2004) understand the comprehensive turn primarily as an expression of the rise of the power of the *middle* class. Secondly, historical support for comprehensive ideals has come from all political families; Henkens (2004), for

[5] Moreover, the extremely left often viciously opposed progressive educational reforms, believing them to propagate the illusion that society could be changed through educational reform and thus to underestimate the need for social, economic and political reform.

example, notes that in Flanders the reform was proposed by a conservative politician and generalized by a liberal one (see Greveling, Amsing, and Dekker (2015) for similar observations in the Netherlands).

Cultural explanations

A more fundamental objection to the power resources perspectives might be that it reduces political positions merely to defending the interests of a constituency and thus underestimates the role of ideology and beliefs. However, as Piketty (1995) argues, ideas matter in politics, independent of interests: '*the main difference between voters is not their differing interests and objective functions but rather the ideas about policies that they have been exposed to during their social life*.' Accordingly, neo-institutionalist scholars (cf. Schmidt (2008)) believe that legitimacy, rather than efficiency, is the main criterion for institutional design; in order to achieve legitimacy, organizational forms have to be in line with general cultural beliefs. To quote Meyer and Rowan (1977), '*the formal structures of many organizations dramatically reflect the myths of their institutional environments instead of the demands of their work activities'*. Recently, educational system design thus also has been postulated to '*reflect inbuilt social values and historical forces*' (Horn (2007)) and to '*cut to the core beliefs about stratification in society'* (Veselkova and Beblavy (2014)).

In a historical perspective (Sass (2015)), the rise of comprehensive education during the 1960s has thus been related to the larger movement towards democratisation (Derouet, Mangez, and Benadusi (2015)) and to the shift towards post-materialist values (Inglehart (2015)). Similarly, Benavot (1983) relates the global decline in vocational enrolment after the Second World War to a shifting mandate for education, with an increasing emphasis on citizenship instead of differentiation. Accordingly, the decline of comprehensive schooling is argued to reflect the ideological changes that followed the economic downturn of the 1970s, which reaffirmed the dominance of economic demands and competitiveness over democratic ideals and post-materialist needs (Wielemans (1991), Henkens (2004)).

However, these broad ideological currents do not yet explain cross-national differences in educational system design: for example, why did Germany reaffirm early stratification in the 1980s, while its Nordic neighbours did not? Isolated attempts to explain system design by ideological differences can be found in Baldi (2012), comparing German and English discourses on education, Heidenheimer (1974), doing the same for Germany and Sweden, and Benavot (1983), relating the difference in skill specificity between

Germany and France to different historical experiences[6]. However, such comparisons remain fragmented and do not produce any *general* explanation of cross-national differences in educational system design. Given the correspondence between educational system and welfare state design reported above, a more systematic explanation would require to examine the ideological bases behind both. In welfare state research, it has indeed become accepted that *'ideas of the good society have always guided welfare state development'* (Van Oorschot, Opielka & Pfau-Effinger (2008)). The central idea behind the liberal welfare state is then argued to be personal responsibility, while conservatist states emphasize group membership and hierarchical relations and social democratic states build on social equality and solidarity. Empirically, a correspondence between the level of support for each of these values and welfare state design has indeed been observed (Grendstad (1999), Likki and Staerkle (2014), Svallfors (2012)). Secondly, these ideological differences are then argued to affect educational system design as well[7]: in particular, social-democratic ideology sees education as the great equalizer (Antikainen (2006) and thus will be naturally inclined to equalise access to quality education at all levels (Peter, Edgerton, and Roberts (2010). By contrast, liberal ideology, which embraces inequality as long as it is the expression of differences in ability and effort ('contest mobility', Turner (1960)), aims to remove barriers that would block talented students, but accepts differentiation on the basis of individual choice. Finally, conservatives are argued to be more pre-occupied with security than with mobility: their natural answer to social inequality is not to delay selection, but rather to develop a high-quality system of vocational education, providing safe pathways for those not deemed fit for academic studies.

Unfortunately, empirical data on beliefs about education, and in particular, on attitudes towards stratification, are sparse. An exception is the TIMSS Case Study Project, an ethnographic analysis of the public school systems of the United States, Japan, and Germany, which LeTendre, Hofer, and Shimizu (2003) used to demonstrate that '*stratification is legitimated by widely held beliefs about how education should operate. Nation-specific values and attitudes determine which forms of curricular differentiation are legitimated and which contested. Dominant cultural beliefs about what students are capable of and the role that schools should play in educating them create different points of conflict over tracking*.'[8]

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[6] In particular, he points to the importance of technical training as the main driver behind Germany's economic rise during the Second Industrial Revolution at the end of the 19th century, and contrasts this to the legacy of the Enlightment in France with its emphasis on humanistic development.

[7] For example, an essay by De Keyser (1986) refers to the 'dialectics between two models of society' to explain educational system design differences.

[8] In particular, they report how German respondents accepted early selection and rigid tracking because '*there is a place for everyone in society and this place can be well chosen in advance. Children's abilities can and should be identified, the school curriculum should adjust for that identification, and schools have a legitimate role in assigning a 'place' for everyone in German national society*.' These beliefs contrasted sharply with those held by respondents from Japan, where tracking is postponed until the age of 15 and middle schools provide equal opportunities to everyone (although in an extremely competitive system, cf. Cantor (1985) and Goodman (1998)). As LeTendre, Hofer, and Shimizu (2003) report, '*there is widespread acceptance that education must be*

Similar observations on cross-national differences in educational beliefs have been reported by Stevenson and Nerison-Low (2002), who juxtapose the German view of achievement as expressing innate ability to the Japanese belief that effort is more important than ability, by Youn (2000), who discusses differences in the epistemic beliefs of Korean and American students, and by Wong, Khine, and Sing (2008), who observe that East-Asian teachers seem less convinced of the fixed nature of ability and relate this to the top performance of these countries in skills assessments tests[9].

Of course, these studies merely consider *existing* differences in belief systems: they do not yet explain *why* these differences occur. Are differences in beliefs the consequence of living and working under different tracking regimes? Or are different tracking regimes the expression of pre-existing differences in beliefs? At least within welfare state research, Svallfors (2012) suggests that '*while institutional arrangements grow out of pre-existing belief and value systems, they also give rise to new beliefs and consolidate existing ones*'; income inequality has also been shown to influence political legitimacy (Andersen, Burgoon, and Van de Werfhorst (2014)). While such a correspondence remains to be examined systematically in an educational context, Mintrop (1997) and Mintrop (1999) show how even the merely formal introduction of tracking immediately affects educational beliefs[10]. Hence, institutional

differentiated, but the point in time is considerably delayed, as compared with that in Germany. The delay seems congruent with beliefs about the role of effort as opposed to ability in determining such outcomes, as students are given longer to demonstrate their competencies before the sorting occurs. For most Japanese, the kind of early, formal differentiation found in German public schools would violate widely held beliefs about equality of opportunity and the role of effort in shaping ability.' Finally, Americans argued that rigid selection '*limits students in developing to the best of their potential',* and the general concern was '*how to tailor the school system to better meet the needs of the individual. The recognition and reward of individual talent was a powerful force legitimating curricular differentiation.'*

[9] At the same time, cross-country differences in belief systems should not be overestimated; instead of opposites, they should be viewed as located on a continuum between differentiation and integration. Cf. the qualification by LeTendre, Baker, Akiba, Goesling, and Wiseman (2001): '*Despite the cultural and historical differences between the US, Germany and Japan, teachers in these three nations often face very similar conditions or problems. The problem of providing adequate instruction to a class consisting of students with heterogeneous ability levels is not determined, or solved by, cultural beliefs. All over the world, not just in the U.S., Germany, or Japan, educators face significant problems in trying to provide equal access to the curriculum for all while simultaneously working to maximize each student's individual potential.*'

[10] Mintrop makes use of the interesting quasi-experiment following the unification of Germany, when the Eastern Länder imported the educational system design from the Western Länder. The unpreparedness and the speed of the reform - the old school structures were simply dissolved by the end of the school year and ordered to reopen as tracked schools after the summer holiday – made track assignment close to random: there were no formal admission criteria. Hence, in the first years, tracks could be regarded as mere constructs that had little to do with real differences in ability. However, Mintrop observes how teachers still expressed a solid belief in the appropriateness of track labels, which, given the absence of any 'functional' justification for these labels, he argues that educational beliefs should thus instead be viewed as *'accommodations to the organizational reality and legitimate ideology'* of the educational system.

arrangements drive beliefs, not just the other way round; to quote Douglas (1986): '*People make new kind of institutions, these institutions make new labels, and these labels make new kinds of people*'.

Path dependencies and complementarities

The perspectives on educational system design discussed above have two important consequences. First, all three perspectives imply a certain level of path dependency: once countries have developed different structures, they may respond to the same pressure in different ways. First, within the functionalist perspective, Estevez-Abe (2001) argues that employers adapt their product market strategies to the existing skill structure: in specific skill systems, such as Germany, firms specialize in the production of high-quality goods requiring an abundance of technical medium-skilled workers, while the polarized skill structure of general systems (USA) leads to a combination of highly innovative branches (e.g. ICT) with low-skilled mass production. This choice for a certain product market strategy of course again raises the demand for workers with the required kinds of skills; hence, skill specificity and product market strategies complement each other in what can be called a 'skill equilibrium.' Secondly, within the power resources perspective. Huber & Stephens (2001) describe (in the context of welfare state development) how a period of political dominance can have consequences exceeding this period. For example, they observe how the introduction of generous welfare schemes increases the support for them, as citizens start to note how they can benefit from them; such a 'policy ratchet[11]' can make it hard for opponents to turn back policies implemented by earlier government. Similarly, they describe how political parties, in order to overthrow the dominance of another party, often have to adapt their positions and incorporate part of its ideology, a process which they refer to as 'structural limitation'[12]. Finally, as already suggested in the work of Mintrop (1999), cultural explanations imply path dependency as well; as Douglas (1986) argues, '*institutions have a hold on our processes of classifying and recognizing (…) and channel our perceptions into forms compatible with the relations they authorize*.'

Secondly, the different perspectives on educational system development can be argued to complement each other. For example, Iversen and Stephens (2008) have suggested that the functional perspective on

[11] A ratchet is a mechanical device that allows continuous linear or rotary motion in only one direction while preventing motion in the opposite direction.

[12] Heidenheimer (1974) indeed observes that political positions on education sometimes differ more between countries than between parties: '*while no Swedish party took a clear-cut parliamentary stand <u>against</u> comprehensivization, in Germany no major Federal or Land party took a clear-cut position <u>for</u> its full implementation'.* Similarly, Wiborg (2004) reports that in Scandinavia conservative parties would not dare to suggest re-introducing a segregated school system, arguing that educational system thus rather reflects some kind of '*ideological consensus among different social strata and political camps*' than partisan political preferences.

system design – which relates it to the degree of coordination in the economy – can be reconciled with the power resources perspective – which relates it the strength of political parties - by reference to the set-up of the electoral system. Their argument is that majoritarian systems in liberal economies favour right-wing policies, as centrists will be inclined to vote for the right out of fear for tax increases under a leftist absolute majority. By contrast, coordinated economies would prefer an electoral system of proportional representation, because this allows the multiple interest groups to feel represented and consensus is needed for a proper functioning of a coordinated economy. Coalition governments however ameliorate the position of the left, as centrists could then opt to ally with the left in order to tax the rich (with no risk that left government would increase taxes universally, due to the restrictions of coalition governments). Hence, economic coordination and political domination are correlated. More in general, the welfare state may link all three perspectives together: it is associated both with the production regime, the political relations and the ideological basis that are believed to influence education system design.

Empirically, indicators from various spheres in society (education, the labour market, welfare state etc.) have indeed been shown to be strongly interdependent, constituting recognizable 'clusters' of variables from different sectors of society (West and Nikolai (2013), Beblavy, Thum, and Veselkova (2011), Schroeder (2009)). This importance of path dependency and of the complementary nature of different explanations behind educational system development is reflected in the concept of the 'educational regime', which is used to emphasize the coherence and stability of the clusters.

Education, meritocracy and social mobility

A transversal theme in this dissertation is social equity: how well do educational systems succeed in providing equal opportunities to different social groups? In this paragraph I will introduce the broader debate about the role of education systems in ensuring social mobility.

As argued by most functionalist scholars (Davis & Moore, 1945; Parsons, 1959), some degree of social inequality is necessary, and educational achievement seems to be both the most efficient and the fairest criterion to allocate individuals to these positions: it is efficient because it ensures that the most talented individuals fill the most important positions, and it is fair to the extent that it places individual characteristics (ability and effort) above ascribed qualities such as social origin. In particular modern

society[13] is then argued to approach this meritocratic ideal, as the rising value of knowledge in the information economy increases the importance of education over social background (Bell (1976)). The vanishing of mere ascription as the dominant mechanism for determining life chances indeed has made current Western society more meritocratic than ever before (see Marks (2005), Breen, Luijkx, Müller, and Pollak (2009) and Breen (2010), although Shavit & Blossfeld (1993) claim that the link between social origin and educational outcomes has remained remarkably stable throughout the 20th century). This tendency is often illustrated through the 'Origin-Education-Destination triangle', in which the direct association between Origin and Destination is argued to decrease and that between Education and Destination to increase: education is the ultimate foundation of social mobility in modern society.

However, this understanding of social inequality as a desirable outcome of educational competition does not imply that the *actually observed* inequality would be unproblematic. Indeed, Durkheim (1956) already warns for potential social biases in school, due to the unfair effect of both cultural and economic disadvantage on educational performance. Indeed, educational careers do not simply reflect effort and ability (Husen (1975)). For example, Boudon (1974) shows that educational choices reflect social origin independent of ability, due to different cost-benefits calculations of parents[14]. Similarly, Jencks (1972) argues that, after controlling for educational achievement, occupational destination still depends on social origin.

For functionalists, any unfair association between social origin and educational or occupational outcomes should be avoided because losing talent among disadvantaged students would threat the proper functioning of the educational system. However, a second group of scholars, mostly influenced by conflict theory, claims that schooling is not simply 'unfair by accident', but that education is *deliberately* designed to reproduce and legitimize existing social inequalities (Bernstein, 1971; Bourdieu & Passeron, 1990; Bowles & Gintis, 1976). Education is then believed to merely function as a mediator for the transmission of social status between generations (Halsey, Heath & Ridge (1980)), with the sole purpose of the discourse about meritocracy to convince citizen that their actual social position is deserved: a '*repackaging of ascriptive forces in terms of achievement*' (Devine and Li (2013)). However, this

[13] Of course, meritocratic claims are much older: the policies instituted by Napoleon Bonaparte, known as '*la carrière ouverte aux talents*', and the German Weimar Constitution of 1919, decreeing explicitly that '*for the acceptance of a child into a school his talent and inclination are authoritative, not his economic and social position*' (Kaes, Jay & Dimendberg (1994)) are well-known early examples.

[14] For example, highly educated parents regard vocational tracks as a demotion, and push their children towards academic tracks, while low educated parents regard *any* secondary qualification as a social promotion and hence accept vocational track placements more swiftly.

perspective seems less able to explain differences in social mobility across countries, and in particular underestimates the rise in social mobility in recent history (Marks and McMillan (2003)).

A long-standing issue in the scientific debate about social mobility is the extent to which a cross-sectionally observed relationship between social origin and educational achievement is necessarily unfair (Marks (2005)). Put simply, educational performance is seen as a function of innate ability and effort on one hand, and a bias because of social origin on the other. The extent to which education is fair then only depends on the size of this 'pure' effect of social origin, i.e. independent of ability. However, the innate ability of a child and the social class of his parents are correlated: parents who had a high innate ability themselves had higher odds to reach an advantaged social status in their lives, but this innate ability is partly genetic and thus will be transmitted over generations (Neisser et al. (1996); Bouchard (2004); Bjorklund, Eriksson, and Jantti (2010); Tucker-Drob and Briley (2014)). Hence, persistent social inequality in educational achievement does not necessarily point at social biases in the school system, but could also reflect an association between social origin and unobserved ability. While this observation should be no more than '*a banality, based on a mathematical necessity*' (Pinker (2003)), it has sparked intense academic discussions (Herrnstein & Murray (1995)) in which educational sociologists all too often dismissed '*the ideology of giftedness (…) which helps to enclose the under-privileged classes in the role which society has given them by making them see as natural inability things which are only a result of an inferior social status*.' (Bourdieu (1974)).

Of course, the fact that the observed association between social origin and achievement does not necessarily point at social biases does not exclude these biases either. There are indeed good reasons to assume that social environment affects educational achievement, net of innate ability[15]. First, quasi-experimental designs have demonstrated that even early ability is more than genes as environmental factors have a marked influence as well[16]. For example, Nisbett et al. (2012) '*establish the importance of*

[15] Apart from not living up fully to the meritocratic promise, two other problems have been associated with the meritocratic ideal. First, educational competitions not only create winners but also losers, who are increasingly told that their loss is due to their own lack of merit (Bell (1976), De Wachter (2012)). To secure the legitimacy of the social system, additional attention for those not making it is needed (Stiglitz (2012), Jungbluth (2015), De Vos (2015)). Secondly, as Young (1958) already warns in his famous science-fiction novel about the future of a meritocratic society, the partial inheritance of ability poses an upper limit to social mobility (Dronkers (1988), Dronkers (2007), Karsten (2008)). This 'ossification problem' (as it was called by Young (2015), ironically, the son of the novel writer) is also argued to threat the stability of the system: the narrator in Young (1958) is killed in a social uprising. While there is no acceptable solution to these problems, they highlight that even in near meritocratic circumstances, a commitment to social equity and cohesion remains appropriate.

[16] Interestingly, the genetic inheritance of ability seems somewhat less pronounced at the lower end of the social spectrum, in particular in the USA, which points at the disturbing effect of having little access to high-quality education and health care on the development of potential ability among the poor (Turkheimer, Haley, Waldron, d'Onofrio, and Gottesman (2003)). Indeed, within Western Europe such an interaction effect

the environment for IQ by the 12-point to 18-point increase in IQ when children are adopted from working-class to middle-class homes'. Similarly, life outcomes do not simply reflect innate ability; for example, Black et al. (2015) conclude from a study among Swedish adoptees '*that wealth transmission is not primarily because children from wealthier families are inherently more talented or more able, but that wealth begets wealth*', while Conley et al. (2015) reports that the largest part of the intergenerational correlation in educational level is indeed due to the social environment itself.

While longitudinal studies, in principle, would allow to disentangle the interplay between early ability, social origin and life outcomes more systematically, results have not yet been entirely convincing. For example, while Saunders (1995, 2002, 2010) claims that in the UK educational opportunities are more sensitive to innate ability then to social origin (although he observes that less able higher class children are given more opportunities than expected), Breen and Goldthorpe (1999, 2001, 2002) and Marshall and Swift (1996) instead report that ability plays only a limited role in the process of intergenerational class mobility. For the Netherlands, Dronkers (1998) observes that early differences in ability strongly affect educational success, but could not completely explain social inequality on the basis of these differences, as social origin still had its own role to play. For Flanders, Blommaert, Meyer, and Van Damme (2015) discuss how problematic school and labour market careers are to some extent predictable from early underachievement, while Van Damme, De Troy, Meyer, and Mertens (2001) and Hermans, Opdenakker, Vandegaer, and Van Damme (2003) show that controlling for early achievement reduces, but certainly not removes, the observed effect of social origin on educational outcomes.

Unfortunately, longitudinal data are often not internationally comparable, and this impedes evaluating the effect of national system design characteristics on the development of social inequality. However, it could be argued that in comparative studies a cross-sectional design may also be informative: to the extent that the unobserved correlation between ability and origin is reasonably similar across the countries under study, a cross-sectionally observed association between origin and outcome may not have an absolute interpretation (since we do not know the size of the unobserved bias) but could still be used to compare the level of inequality across countries and thus the relative effect of system design characteristics (Fischer, Hout, Sanchez Jankowski, Lucas, Swidler, Voss & Bobo (1996)). In Chapter 2, I propose a technique to further improve the comparative investigation in this regard.

between social origin and heritability is not observed, pointing at the role of welfare policies in unlocking the potential of disadvantaged children (Tucker-Drob and Bates (2015)).

Overview of this dissertation

Within the framework sketched above, this dissertation will explore quantitatively the relationship between the characteristics of the educational system and its outcomes over the entire 'life cycle' of its pupils: immediate effects (skill levels), intermediate effects (school dropout), and long-term effects (labour market careers and lifelong learning participation). These different time horizons make it necessary to combine data from a multitude of international comparable sources. The immediate effect of the educational system on skill levels will be explored using scholastic achievement tests, in particular PISA (Programme for International Student Assessment: mathematical, scientific and reading literacy of 15 year olds), TIMSS (Trends in International Mathematics and Science Study: mathematical and scientific literacy of 4th and 8th graders), and PIRLS (Progress in International Reading Literacy Study: reading literacy of 4th graders). Medium- and longer term outcomes will be examined using data from PIAAC (Programme for the International Assessment of Adult Competencies: mathematical and reading literacy and problem solving skills of adults aged 15-65), the LFS (Labour Force Survey: labour market outcomes of adults aged 15-65) and the AES (Adult Education Survey: lifelong learning participation of adults aged 25-65). To deal with such a large volume of data, a range of statistical techniques (regression analysis, multi-level analysis, principal component analysis …) have to be used.

In Chapter 2, I will explore the effect of different tracking regimes on **skill levels**. At first sight, sorting pupils according to ability may hold the promise of facilitating tailored instruction at the right level and pace for every student, fostering higher achievement and thus increasing the efficiency of the educational system. However, this view has been repeatedly challenged: in particular, weak students could lose from early tracking as shifting these pupils to less demanding tracks would lead to ignoring their problems rather than addressing them (Oakes (1993)). Early tracking has also been argued to increase social inequality in the educational system. The assignment of young pupils to tracks has proven to be far from noiseless (Dustmann (2004)), with social background biasing track placement (see Boone and Van Houtte (2012) for Flanders). If socially disadvantaged students are disproportionally selected into less prestigious tracks, where they encounter less stimulating learning environments, this may hamper their performance. Empirically, the link between tracking and (social inequalities in) skill proficiency has already been examined extensively from a comparative point of view (see e.g. the review by Van de Werfhorst and Mijs (2010)). However, these comparative analyses often simply consider the link between cross-sectionally observed levels of social inequality and characteristics of the educational structure. An important difficulty in this kind of studies is that countries have many different features that may influence the observed association between social origin and achievement (for example, the level of income inequality, the degree of pre-primary school attainment, or the spread of private schooling). Simply statistically correcting for such confounders can never ensure that indeed *all* relevant confounders have been taken

into account; indeed, as I showed in an article for *Pedagogische Studiën* (Lavrijsen and Nicaise (2014)), an incomplete control may lead to biased estimates. Secondly, as explained above, comparing cross-sectionally observed effects of social origin has to assume that the bias due to the unobserved correlation between early ability and social origin is of the same magnitude for all countries under study. The solution to both problems I propose here is applying a differences-in-differences approach. Essentially, diff-in-diff corrects outcomes in secondary education for differences in the average starting positions of students (i.e. outcomes measured in primary education). The effect of tracking on skills is thus determined by comparing secondary school results (which are influenced by the onset of tracking) with results from primary school (which are not). Chapter 2 reports the results of this research, published in the *European Education Research Journal* (Lavrijsen and Nicaise (2015a)).

Subsequently, Chapter 3 considers how educational system characteristics influence social inequalities in **school dropout**, i.e. quitting formal education without a qualification at the secondary level. As dropout is often the endpoint of a problematic educational career, some correspondence between the effects in terms of skill performance and in terms of dropout can be expected; for example, early tracking mag strengthen the link between social background and dropout (Brunello and Checchi (2007); Pfeffer (2008)). On the other hand, well-developed vocational education systems may act as a safety net against dropout for the less academically inclined students (Shavit and Muller (2000); Bol and Van de Werfhorst (2013)). However, school dropout does not only depend on educational failure: for example, rational choice theory (Breen and Goldthorpe (1997)) argues that the broader socio-economic context affects the costs and benefits associated with staying at school (for example, the opportunity cost of staying in school depends on how easily a school leaver would find a job) and thus influences dropout decisions as well. Moreover, as argued above, students with a comparable educational achievement may arrive at very different cost-benefit evaluations depending on their social background (Boudon (1974)). Chapter 3, which has been published in European Education (Lavrijsen and Nicaise (2015b)), thus examines how a set of macro-level determinants from both the educational system and the broader socio-economic context influences social inequalities in school dropout, based on data[17] from the Labour Force Survey Ad Hoc Module (2009).

Chapter 4 then shifts the attention to longer term effects of education, in particular **labour market careers**. Comparative evaluations of educational systems have often relied on international student

[17] While the LFS Ad Hoc Module 2009 is the preferred source as it includes information on both social origin and educational attainment, its cross-sectional nature impedes making strong causal claims. In another article, which I published as a co-author in the *European Journal of Education* (De Witte, Nicaise, Lavrijsen, Van Landeghem, Lamote, and Van Damme (2013)), we used time series based on the LFS core questionnaire to examine the effect of macro-level determinants on *absolute* dropout rates (i.e. without reference to social origin, which is not collected in the core questionnaire).

assessments which evaluate the level of *general* skills (mathematics, literacy, science). Of course, these are very important competencies, of which a decent basis is a necessity to function in modern society. However, they may not tell the whole picture: in particular, they do not appreciate the specific skills that educational systems produce in their vocational tracks. As explained above, we expect vocational training to increase the employability of young school leavers because it provides skills that are immediately relevant and the workplace (moreover, apprenticeships give young people access to employer networks) (Breen (2005); Iannelli and Raffe (2007); Müller and Shavit (1998); Müller and Gangl (2003); Van de Werfhorst (2011)). Accordingly, vocational oriented education systems have been related to relatively low youth unemployment rates (Gangl (2001)) and stable employment patterns among young labour market entrants (Allmendinger (1989)). However, labour market outcomes of vocational education has mostly been observed during the transition period in which school leavers enter the labour market. It has been suggested that, as a consequence of changing labour market demands, vocational education might lose some of its original value over time: when the occupational requirements change, for example because of technological developments, the occupation-specific skills that were delivered in initial education bear the risk of becoming obsolete. By contrast, a strong foundation of general skills would enable workers to adapt to changing labour market needs through life-long learning. Using PIAAC-data (2012), Chapter 4 empirically tests this idea by comparing the employment probabilities[18] and earnings of vocational and general education graduates over time, controlling for differences in selectivity.

Finally, Chapter 5 further considers the relationship between educational system design and **lifelong learning**. In the literature, it has been repeatedly observed that countries differ in average lifelong learning participation rates, and that participation is unequally distributed across socio-economic groups, with the low-educated participating below average. Both patterns have been explained within a bounded agency framework, in which individual choices about participation are influenced by the design of the welfare state (Rubenson & Desjardins (2009); Boeren, Nicaise & Baert (2010); Desjardins & Rubenson (2013)). Using data from the Adult Education Survey (2011) and PIAAC (2012), Chapter 5 starts by confirming these patterns, showing how national welfare policies indeed seem to influence the prevalence of self-reported barriers to lifelong learning (in particular: costs, family responsibility, and conflicts with the work schedule). However, reducing external barriers alone seems insufficient: in some countries, a rather small share of the respondents reported to have been withheld from participation by such an external barrier, but the participation rate remained low. In fact, by far the largest part of the non-participants does not report *any* external barrier to explain their non-participation: instead, most

[18] For similar reasons, vocational oriented systems have also been linked to a lower prevalence of occupational mismatch in the beginning of the career (Verhaest and Van der Velden (2013)). In a joint article with Verhaest, Lavrijsen, Van Trier, Nicaise, and Omey (2016) I showed that this advantage however decreases as well over the career, although the overall effect was positive (lower mismatch among vocational graduates).

respondents indicate to be ‘just not willing’ to participate. Moreover, this is particularly the case for low qualified non-participants. Chapter 5 considers why the size of this group that is ‘just not willing’ to participate differs drastically between countries: why are countries more or less successful in promoting the interest in lifelong learning among their citizens, in particular among those with a low initial level of education? Using information from PIAAC on the attitude of respondents towards the very concept of ‘learning’, I consider how early tracking and grade repetition affects the formation of attitudes towards learning. I further scrutinize this argument by controlling the attitudes towards learning recorded among adults (PIAAC) for similar attitudes recorded at earlier moments in the educational career (PIRLS and TIMSS), making use of diff-in-diff and pseudo-panel techniques.

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CHAPTER 2 - NEW EMPIRICAL EVIDENCE ON THE EFFECT OF EDUCATIONAL TRACKING ON SOCIAL INEQUALITIES IN READING ACHIEVEMENT

This Chapter has been published as Lavrijsen, J. & Nicaise, I. (2015), 'New empirical evidence on the effect of educational tracking on social inequalities in reading achievement', European Educational Research Journal, vol. 14, p. 206 - 221.

Abstract

One of the major imperatives behind the comprehensivation of secondary education was the belief that postponing the age at which students are tracked in different educational routes would mitigate the effect of social background on educational outcomes. Comparative investigations of large-scale international student achievement tests in secondary education, such as PISA, have indeed suggested that individual test results depend less on social origin in countries that have postponed tracking age. However, a crucial pitfall in such cross-sectional studies is that many other factors influence the effect of social origin on achievement as well. In order to account for possible unobserved confounder bias, and to acknowledge the fact that part of the social origin effect already exists prior to the introduction of tracking, we apply a difference-in-differences-analysis to data from PIRLS (primary education, 2006, N = 33, *n* = 171.486) and PISA (secondary education, 2012, N = 33, *n* = 235.378). Our results confirm that the introduction of tracking increases the effect of social origin on reading achievement between primary and secondary education. This lends further support to the argument that postponing the tracking age can foster social equity in educational achievement.

Introduction

During the last decades, many Western countries have been addressing the comprehensivation of their educational systems. An important ingredient was the postponement of the age at which students get tracked into different educational pathways, often a vocational and an academic track. The central argument behind this change was the belief that postponing tracking age would mitigate the strength of the association between social background and educational outcomes (Antikainen (2006); Baldi (2012); Henkens (2006); Horn (2007); Peter, Edgerton & Roberts (2010)), and that comprehensivation would thus foster the social equity of the educational system.

There are indeed good reasons to expect tracking to strengthen the link between social background and educational performance. Socially disadvantaged students seem to be disproportionally selected into less prestigious tracks, where they encounter less stimulating learning environments which may hamper their performance. The first part of the argument - children from a lower social background are more often placed in lower tracks, even after accounting for prior performance - has been empirically substantiated in studies from several countries: see Boone & Van Houtte (2012) for Flanders, Ditton & Krusken (2006) for Germany, and Duru-Bellat (2002) for France, among others. The educational ambitions of young pupils seem to be strongly influenced by the role models perceivable in their social environment, such that the aspirations of students with parents from less prestigious professions are usually more modest than those of children from high-SES parents (Breen & Goldthorpe (1997)). When tracking decisions have to be made already at a young age, the parental voice is still utterly important, and the impact of socio-economic background on track placement will be strongest (Brunello and Checchi (2007)).

The second part of the argument claims that, on average, being in a lower track hampers performance, not only compared to being in an upper track, but also compared to being in an undifferentiated, heterogeneous education system (Hanushek & Woessmann (2006)). The argument here is that shifting students to a less demanding track, where the curriculum is less challenging and the learning environment far from optimal, rather leads to ignoring learning difficulties instead of adequately addressing them (Oakes (1993), Hallinan and Kubitschek (1999), Hattie (2002)). Moreover, educational resources tend to be unequally distributed across tracks (Darling-Hammond (1996)), and the most experienced and most capable teachers often are assigned to the high tracks, leaving the lower tracks to the less experienced teachers (OECD (2012)). Teachers in the lower tracks also tend to develop lower expectations towards their students and act accordingly (Van Houtte (2004)), e.g. by devoting less time to actual instruction (Oakes (1992); Hallinan (1994a)). Likewise, the fact that students in lower tracks often end up there because of negative selection may give rise to the development of an entire class culture that gets negatively oriented towards learning, further damaging the learning climate and performance in the

lower tracks (Van Houtte and Stevens (2008; 2010). On the other hand, it has been argued that sorting pupils according to ability facilitates instruction at the right level and pace, and thus might increase the overall efficiency and performance of the educational system performance ('specialization benefit', e.g. Figlio & Page 2002; Hallinan (1994b); Duflo et al. (2008)). This might imply that even for those in the lower tracks, tracking might be beneficial for educational performance. Similarly, the ability level of class-room peers influences individual performance as well, but neither the size nor the direction of such peer effects is yet fully clear (e.g. Hoxby (2000); Hanushek et al. (2003), Dobbelsteen et al. (2002)).

Methodological issues in comparative research

The above arguments mostly suggest that systems with early tracking could involve less equal learning opportunities, with stronger ties between social origin and educational achievement. Empirical comparative research indeed has seemed to corroborate this hypothesis: in their review of the literature, Van de Werfhorst & Mijs (2010) concluded that most studies found that early tracking led to stronger effects of social background on performance. The literature on which this conclusion was based has mainly exploited two different research designs. A first series of studies examined the effect of a specific educational reform in a single country. For example, Pekkarinen, Uusitalo, and Pekkala Kerr (2013) examined the effect of a Finnish reform that postponed tracking from 12 to 16 in the '70s. Using cognitive test scores from the military service entry exam, they showed that the reform improved the performance of those coming from socially disadvantaged backgrounds, both in terms of their absolute cognitive level as in terms of their relative position compared to those from advantaged backgrounds. The reform thus seems to have succeeded in alleviating the effect of social origin on achievement. Similar results were found in studies on educational reforms in Norway (Aakvik, Salvanes & Vaage (2010)), Sweden (Meghir & Palme (2005)), and Poland (Jakubowski (2010)). By contrast, Galindo-Rueda and Vignoles (2004) argued that the demise of the British selective grammar school system led to an increase rather than a decrease in the effect of parental background on achievement, though Manning & Pischke (2006) have questioned the validity of this conclusion because of selection bias problems, as the implementation of the reform seemed to be correlated with cognitive achievement itself. An overall concern with studies evaluating a specific reform in a single country is that educational reforms usually comprise a whole bundle of policy measures, which makes it difficult to disentangle the effect of postponing tracking and to extrapolate it to other settings.

A second series of studies broadens the scope to a comparative, cross-sectional analysis of several countries, in which the social origin effects in countries with different tracking regimes are compared at a

single point in time. For each country, the association between individual student achievement and social origin is determined, after which correlations between the observed associations and the features of each national educational structure can be analysed. This design has been facilitated by the proliferation of large-scale standardized student achievement datasets, in particular PISA, which deliver micro-data on achievement of 15-year-olds and their social origin for a large number of countries. The most important difficulty in these studies is that countries have many different features that could all influence the observed association between social origin and achievement, such as the level of income inequality, the degree of pre-primary school attainment or the spread of private schooling, among other things. As these could all spur the observed relationships, cross-national research has to take possible confounders accurately into account in order to provide unbiased estimates of the effect of tracking.

Several studies have used this cross-sectional approach to explain the strength of the association between social origin and achievement in terms of educational structures. For example, Duru-Bellat & Suchaut (2005) used PISA 2000 data to show that social inequalities in secondary school achievement were larger in countries that track their students at an earlier point in their careers. To accommodate for possible confounding variables, GDP/capita and the Gini-inequality index were controlled for in the models, which apparently did not change the main message. Horn (2009) came to an analogous conclusion on PISA 2003 data: the larger effect of social origin on achievement in early tracking countries survived when other relevant differences in the education system (school autonomy, use of central exams) were controlled out. Similarly, data from PISA 2009 led Bol & Van de Werfhorst (2013) to conclude that early tracking was related to less equal opportunities after controlling out differences in wealth, educational expenditure and private schooling rates. While these and other studies (Dupriez & Dumay (2006); Dupriez, Dumay & Vause (2008); Schütz, Ursprung & Woessmann (2008)) considered cross-national differences in educational structures, Woessmann (2010) showed that also when tracking age variations between German regions were considered, early tracking seemed to be associated with a stronger impact of social origin and achievement.

However, the perennial problem with all these (and other) attempts is that no-one can ever be sure that indeed *all* relevant country-level confounders have been taken into account. Moreover, the country samples are usually rather limited in size (typically between 20 and 30 countries), which impedes a simultaneous control for many confounders in a single model. Finally, some of the possible confounders may prove difficult to measure (e.g. cultural values). This all means that cross-sectional approaches always have to acknowledge that the observed effects may be, to some extent, spurious.

Secondly, a particular concern for comparative analyses of social origin effects might be that a correlation between social origin and achievement observed in cross-sectional datasets could partly reflect a correlation between social origin and innate ability. In modern societies individuals with high (innate)

ability have higher odds to reach an advantaged social status in their lives (Herrnstein 1973; Bell 1976). But innate ability is partly genetic and thus will be transmitted over generations (Neisser et al. (1996); Turkheimer et al. (2003); Bouchard (2004)). This means that observing a correlation between social origin and achievement does not necessarily contradict the meritocratic ideal that educational performance should only depend on ability and effort - only when social origin would have a 'pure' effect on achievement (i.e. independent of ability), equality of opportunities would be violated (cf. Saunders (1995); Breen & Goldthorpe (1999)). Hence, in simply comparing the observed social origin effect across countries, one implicitly assumes that the – unobserved - correlation between ability and social origin was the same for all countries under study. If this condition would not be met, this would bias the cross-national comparison.

The solution of difference-in-differences

We will deal with both the above concerns by combining individual data on achievement and social origin in secondary education (PISA, 15 years olds) with similar data from a primary education assessment (PIRLS, 4th grade). This will allow us to control the association between social origin and achievement in secondary education for the association that already exists in primary education. Hence, first, such a 'differences-in-differences'-approach removes possible bias by unobserved confounders (e.g. income inequality), as such confounders would impact the observed association between social origin and achievement on both measurement points. By contrast, tracking age only affects the social origin effect at age 15 (as some countries have already tracked their students before this point, while others haven't), but not at age 10 (as at this stage students are still untracked in all countries). Hence, by comparing the difference in the social origin effect between both measurement points, the net effect of tracking can be determined without having to include the individual confounders in the model themselves. Secondly, the diff-in-diff-approach allows us to circumvent the possible bias due to the cross-country differences in the association between innate ability and social class. Such an association will be absorbed in the social origin effect observed on both measurement points, and consequently, possible differences between countries in the size of this association will not distort estimates based on the change in the social origin effect between both points.

This diff-in-diff-approach thus bears similarities with the frequently cited article by Hanushek & Woessmann (2006), who exploited a similar methodology to show that early tracking increased the achievement gaps between low and high performers. However, Hanushek & Woessmann (2006) did not consider the effect of social origin itself, leaving this out for 'further research'. To our knowledge, only

two contributions (published as Working Papers) have tried to address this task. First, Ammermüller (2005) exploited data from PIRLS 2001 and PISA 2000 to confirm that tracking was associated with a larger increase in the effect of parental background between primary and secondary education. Secondly, Waldinger (2006) performed a series of diff-in-diff analyses on data from PIRLS 2001, TIMSS 1995 and 1999, and PISA 2000 and 2003. However, Waldinger did not find a clear effect of tracking on the increase in the social origin effect, leading him to the claim that the suggestions coming from the cross-sectional studies must have been due to omitted variables bias. Both attempts however suffered from important weaknesses, mostly due to low country sample sizes. As only countries that participated in both the primary and the secondary assessment can be included in a diff-in-diff-model, samples turned out to be not larger than 12 countries in Ammermüller (2005) and between 8 and 14 countries (depending on the specification) in Waldinger (2006). This makes the entire set-up quite heavily dependent on the specific features of the few countries considered. For example, in Waldinger (2006) only 2 to 4 early tracking countries (depending on the specification) were considered. Also note that the attempts did not yet use the full richness of the social background data available; for example, Ammermüller (2005) collapsed the information on the educational level of the parents into a dichotomous variable, only indicating whether or not the parents acquired a university degree.

Our article aims to add to the understanding of the influence of early tracking on the effect of social origin on educational achievement in the following ways. First, we will account for both the omitted variables problem and the correlation between ability and social origin, which are inherent to all cross-sectional design studies, by applying a diff-in-diff-analysis, in which we correct social origin effects in secondary school for the 'pre-treatment' effect already existing in primary school. Secondly, we will improve on both previous attempts that followed this route by making use of more recent student assessments: as participation in student assessments is now much more widespread, this allows us to construct much larger samples (up to 33 countries), and thus to arrive at more reliable conclusions. Finally, we will take full advantage of the richness of the social background data included in the student assessments.

Data and methodology

A diff-in-diff-analysis of social origin effects necessitates data on both educational achievement and social origin at two different points in the school career, one in primary school (when all students are still educated together in every country) and one during secondary school (when students already have been tracked in some countries, but not in other). There are three large-scale student assessments that can

deliver such data: for primary education we can use data from PIRLS (reading literacy) or TIMSS (science and mathematics), which are both collected in the 4th grade, while for secondary education we can use data from PISA (reading, science and mathematics), performed at 15 years of age, or again TIMSS (science and mathematics), which also collects data in the 8th grade. Regarding the latter measurement point, PISA is preferable to TIMSS as the average age of the respondents is considerably higher in PISA (15.8 years compared to 14.3 years), which means that tracking has had considerably more time to exert its influence, making the effects better observable. Regarding the primary measurement point, PIRLS is preferable to TIMSS because the definition of 'achievement' is more similar between PIRLS and PISA than between TIMSS and PISA. Indeed, both PIRLS and PISA measure the proficiency to use reading skills in real-life situations (compare Mullis et al. 2006 with OECD (2013a); also Grisay, Gonzalez & Monseur (2009)). By contrast, TIMSS is more focused on the extent to which a certain curriculum is mastered (Micklewright and Schnepf 2007). From the available waves we use the data from the PIRLS 2006 wave and the PISA 2012 wave: as the time gap between both waves is close to the age difference of the respondents in their sample, both samples can be assumed to have been drawn from roughly the same population (those who were 10 in 2006 and those who were 15 in 2012 are from about the same birth cohort) [1].

As Table 1 shows, a sample of 33 countries participated in both assessments, of which 23 are members of the OECD. The full dataset contains information about 170.000 respondents from PIRLS and 235.000 respondents from PISA. Table 1 also lists the tracking ages as reported by OECD (2013b).

Table 1: Participating countries, sample sizes, and tracking ages.

Country	OECD	PIRLS	PISA	Tracking age	Country	OECD	PIRLS	PISA	Tracking age
Austria	**X**	5.067	4.755	10	**Luxembourg**	X	5.101	5.258	13
Belgium (Fl.)	**X**	4.479	4.877	12	**Latvia**		4.162	4.306	16
Belgium (Fr.)	**X**	4.552	3.720	12	**Netherlands**	X	4.157	4.460	12
Bulgaria		3.864	5.282	13	**Norway**	X	3.837	4.686	16
Canada	**X**	20.566	21.544	16	**New Zealand**	X	6.256	4.291	16
Denmark	**X**	4.001	7.481	16	**Poland**	X	4.855	4.608	16
England	**X**	4.037	9.714	16	**Qatar**		6.681	10.966	15
Spain	**X**	4.094	25.313	16	**Romania**		4.273	5.074	14
France	**X**	4.404	4.613	15	**Russia**		4.721	5.232	16
Germany	**X**	7.899	5.001	10	**Scotland**	X	3.775	2.945	16
Hong Kong		4.712	4.670	15	**Singapore**		6.390	5.546	12
Hungary	**X**	4.069	4.810	11	**Slovenia**	X	5.337	5.911	14

Indonesia		4.774	5.622	15	**Slovak Republic**	X	5.381	4.678	11
Iceland	**X**	3.673	3.509	16	**Sweden**	X	4.394	4.736	16
Israel	**X**	3.908	5.055	15	**Taiwan**		4.590	6.046	15
Italy	**X**	3.581	31.073	14	**United States**	X	5.195	4.978	16
Lithuania		4.701	4.618	16	**TOTAL**		171.486	235.378	

Both PIRLS and PISA deliver individual reading achievement scores in terms of 5 plausible values, which we use in accordance with the recommendations from the Technical Reports, i.e. all coefficients and standard errors were estimated by averaging the results from 5 separate regressions.

In order to determine the strength of the association between social origin and achievement, we have two make two choices. First, we have to choose a measure to represent social origin. Secondly, we have to choose a statistical measure that summarizes the strength of the association between social origin and achievement.

PISA contains information on three different dimensions of social origin. First, the highest occupational status of the parents is provided as the status score that corresponds to the occupation reported by the parents (4-digit ISCO), according to the scheme of Ganzeboom, De Graaf & Treiman (1992). Secondly, the highest educational level of the parents is presented in terms of ISCED-level and years of education. Thirdly, an indicator of household equipment aggregates information on the presence of 23 different items in the household (e.g. books, ICT-material, newspapers …). The information on these three characteristics (occupation, education and material possessions) is aggregated by means of principal component analysis and reported as the Index of Economic, Social and Cultural Status (ESCS); it is this aggregated variable that most previous research has used to represent social background, as it covers all relevant dimensions of social origin.

In PIRLS, the social background information is somewhat more limited. In contrast with PISA, PIRLS reports the occupation of the parents only on a 1-digit ISCO-scale, which is too rough for the derivation of occupational status scores. The dataset also contains information on the highest educational level of the parents in terms of the ISCED-level (which we translated into years of education with the scheme derived from PISA). There is also information on the availability of 7 household items (of which 3 overlap with the PISA-items, including the number of books at home). The dataset also contains an assessment of the financial position of the family, as perceived by the parents. PIRLS also reports an aggregated index, aimed at combining information from several measures. However, this Index of Home Educational Resources (HER) did not use principal component analysis, but was simply constructed by placing all combinations of parental education and the number of available household items into three discrete categories. This of

course leads to considerable loss of data and detail. Finally, while social background information was almost complete in the PISA dataset, some of the social background variables in PIRLS had a considerable amount of missing data (up to 20% for some variables in some countries). These missing data might be non-random, e.g. when socially disadvantaged parents are more likely not to answer all background questions, or when low-performing students are less attentive to fill in the entire questionnaire.

Hence, we improved the data comparability between PIRLS and PISA in two ways. First, we used imputation, in which we predict the missing values on the background information available, to reduce the number of missing values in the PIRLS dataset. We will report both imputed and not imputed data analyses. Secondly, we constructed in the PIRLS dataset a new aggregate index that resembles the PISA-ESCS-index more closely than the original (discrete) HER-index did. This new index, which we label the ESCS'-index, combines all the available information on education, the financial position (as a possible proxy for occupational status), and household possessions. By using principal component analysis [2], we aggregate this information in one index, which, just as the PISA ESCS-scale, aggregates all the dimensions that play a role in the effect of social origin of achievement in one continuous measure.

Finally, we will use two statistical measures to express the strength of the association between social origin and achievement. First, we use the variance in reading achievement scores that is explained by social origin, i.e. the R^2 of the regression of achievement on social origin. This variable reflects how closely individual achievement is related to social origin: a large R^2 indicates that achievement is strongly predictable by social origin and, hence, that social mobility is relatively limited. Secondly, we use the slope of the regression line of achievement on social origin. This indicates how fast achievement increases when respondents come from a more advantaged social background.

Our diff-in-diff model can then be constructed as follows. First, for every country and for both assessments separately, we run a regression of individual reading achievement on social background. Secondly, the R^2 resp. the slope of these regressions are then used as the input for the country-level regression

$$Y_{\text{secondary,i}} = \text{a} + \text{b} \,.\, Y_{\text{primary,i}} + \text{c} \,.\, T_{\text{i}} + \varepsilon_{\text{i}} \qquad (1)$$

in which $Y_{secondary,i}$ is the association between social origin and achievement for PISA in country *i* and $Y_{primary,i}$ is the association between social origin and achievement in PIRLS. T_i is our country-level tracking indicator. We use both a continuous indicator, i.e. the number of years that students have spent in a tracked system before age 15, and a dichotomous indicator, i.e. an 'early tracking' dummy equal to 1 if and only if tracking has already taken place. We run our models both on the full sample and on the 23 OECD-countries separately.

Results

As an illustration, we start by estimating the association between achievement in PISA and the aggregate variable representing social origin (ESCS-index). Table 2 presents the results for the two statistical measures of association, R^2 and slope.

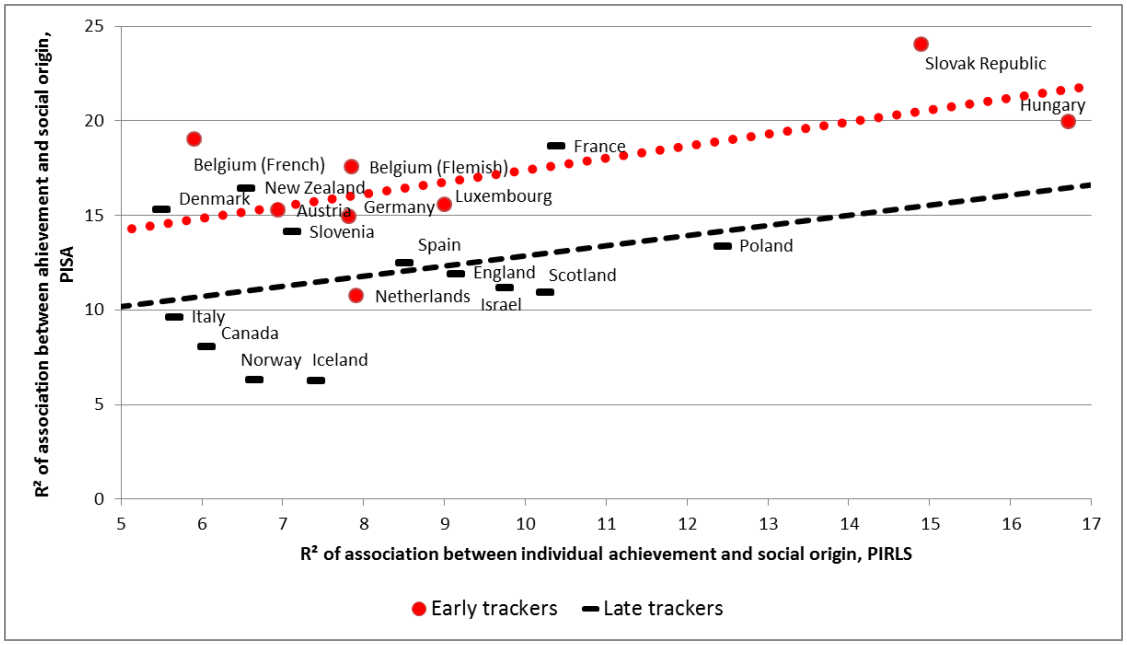
Table 2: Association between social origin and reading achievement in PISA

Country	R^2	Slope	Country	R^2	Slope
Austria	15,3	42,0	**Luxembourg**	15,6	37,4
Belgium – Fl.	17,6	44,2	**Latvia**	14,0	35,6
Belgium - Wall.	19,1	50,0	**Netherlands**	10,8	38,7
Bulgaria	21,9	52,5	**Norway**	6,3	32,7
Canada	8,1	29,7	**New Zealand**	16,5	51,6
Denmark	15,3	39,1	**Poland**	13,4	35,5
England	11,9	41,2	**Qatar**	5,2	28,9
Spain	12,5	31,3	**Romania**	16,5	38,5
France	18,7	58,2	**Russia**	13,1	43,1
Germany	15,0	37,5	**Scotland**	11,0	34,3
Hong Kong	5,2	19,9	**Singapore**	15,2	42,8
Hungary	20,0	42,4	**Slovenia**	14,2	39,6
Indonesia	6,2	17,1	**Slovak Republic**	24,1	55,6
Iceland	6,3	29,7	**Sweden**	9,1	38,1
Israel	11,2	44,3	**Chinese Taipei**	15,1	42,0
Italy	9,7	30,8	**USA**	12,6	33,3
Lithuania	11,3	31,6	***Average (st. dev.)***	***13,3 (4,9)***	***38,5 (9,1)***

Usually cross-sectional research would go on calculating the correlation between the observed measures of association and the tracking age in the countries considered. Our diff-in-diff-model will instead examine how the association observed in PISA can be explained by means of the association already observed in PIRLS on one hand and tracking age on the other. Figure 1 visualizes the idea (for R^2 as the measure of association): for every country, the vertical axis contains the observed association in PISA (cf. Table 2), while the horizontal axis adds the corresponding value observed in PIRLS (in which we used the original HER-index to represent social origin). Notwithstanding the differences in the variables characterizing social origin between both datasets, there is a clear association between the observed values in both datasets ($rho = 0,53$, $p < 0,01$). This precisely underlines the value of our approach: a large part of the social origin effects observed in secondary education is already present in primary education. However, at the same time, there is a clear difference between the regression line for the early tracking

countries and the corresponding regression line for the late tracking: given the existence of a certain association in primary education, the association in secondary education is stronger if the country has adopted an early tracking system. Hence, while the social origin effect in secondary education certainly has part of its root in primary education, the introduction of early tracking does seem to increase this effect, net of the effect already existing in primary education.

Figure 1: The association between social origin and reading achievement, in primary (X-axis) and secondary (Y-axis) education.



We will now quantify this effect, and further verify its robustness, by running Equation (1) for different measures of association between social origin and achievement (R^2 or slope), different social background variables constructed in PIRLS (the original HER-index or the newly defined ESCS'-index; for PISA we use the ESCS-index), the different ways to operationalize tracking (as a dichotomous 'early tracking' variable or as the number of years spent in a tracked system prior to the second measurement point), and different country samples (the full sample or a sample restricted to OECD-countries), and to data-sets with or without the use of imputation.

Table 3 starts with using the variance in achievement explained by social origin (i.e. R^2) as the measure of association, as applies this measure to the different social background variables. First, the association in PISA is indeed significantly related to the size of the association already observed in PIRLS, which again underlines the value of a diff-in-diff model. Secondly, although their significance varies somewhat depending on the specification, , all estimates of the effect of tracking are consistently pointing in the same direction: early tracking always leads to a higher share of the variance in reading achievement that can be explained by social origin. This effect is observed in all specifications, regardless of which variable

we chose to measure social background in PIRLS (HER or ESCS'), regardless of the way we characterize tracking (dichotomous or continuous) and regardless of the use of imputation (though imputation increases the fit of the model). Over all specifications, early tracking leads to an increase between 3.1 and 4.6 percentage points in the size of the variance explained by social origin, which is both statistically significant and practically relevant (e.g. close to one standard deviation in the full sample, see Table 2). Equivalently, every year a student spent in a tracked system leads to an about 1 percentage point higher explained variance in secondary school achievement. Finally, note that our two improvements to the social background data in PIRLS indeed seem to increase the statistical power of our models: both the use of the ESCS'-scale, which aggregates all social background-data into one continuous measure instead of the discrete HER-scale, and the use of data imputation increases the R^2 of our diff-in-diff-model, leading to more accurate predictions. Hence, in what follows we will use the ESCS' as the preferred measure of social origin in PIRLS and perform our analyses on the imputed dataset.

Table 4 shows that we get very similar results when we use the regression slope, instead of the explained variance (R^2), as the measure of association between social origin and achievement. Again, social origin already has a large effect on achievement in primary education and this effect persists in secondary education. But yet again, on top of this pre-existing social inequality, the presence of early tracking leads to sizeably steeper gradients (the difference of about 7 points is again both statistically significant and practically relevant, cf. close to one standard deviation in the full sample, Table 2). Note that the model fit (adjusted R^2) of the diff-in-diff-models using regression slopes (Table 4) are somewhat lower than those for the corresponding models that used explained variance as the measure of association (i.e. the last four columns from Table 3).

Table 3: The influence of tracking on the increase in the social origin effect (R^2) between primary and secondary education. Dependent variable: social origin effect in PISA. Measure of association between social origin and achievement: R^2. *** p < 0.01; ** p < 0.05; * p < 0.1

	Social origin in PIRLS measured by											
	HER-index				ESCS'-index				ESCS'-index, with imputation			
	All	OECD	All	OECD	All	OECD	All	OECD	All	OECD	All	OECD
Intercept	6.63	7.01	6.79	7.00	6.19	6.90	6.16	6.70	5.95	5.95	5.88	5.74
Social origin effect in PIRLS	0.65***	0.60**	0.65***	0.62**	0.47***	0.41**	0.49***	0.44**	0.49***	0.48**	0.51***	0.52***
Tracking measure												
Early tracking	4.63***	4.38**			3.93***	3.83**			3.48**	3.14*		
Number of years tracked			1.12***	1.08**			0.90**	0.92*			0.75*	0.74
R^2 (adj.)	0.50	0.43	0.44	0.40	0.58	0.50	0.53	0.48	0.61	0.55	0.57	0.54
N	32	22	32	22	31	21	31	21	31	21	31	21

Table 4: The influence of tracking on the increase in the social origin effect (slope) between primary and secondary education. Dependent variable: social origin effect in PISA. Measure of association between social origin and achievement: regression line slope. *** p < 0.01; ** p < 0.05; * p < 0.1

	Social origin in PIRLS measured by ESCS'-index, with imputation			
	All	OECD	All	OECD
Intercept	20.50	17.95	20.83	18.17
Social origin effect in PIRLS	0.56***	0.64**	0.57***	0.64**
Tracking measure				
Early tracking	7.16***	6.05**		
Number of years tracked			1.54**	1.42*
R^2 (adj.)	0.46	0.39	0.39	0.35
N	31	21	31	21

However, the fact that early tracking increases the slope of the regression line does not necessarily imply that it would hinder the educational achievement of socially disadvantaged students. For example, even when tracking would be beneficial to every student (cf. the alleged 'specialization benefit'), it could still make the regression line steeper as long as the benefit is largest for socially advantaged students. Hence, we additionally perform an analysis of the performance growth for different social groups of students. We identify four groups of students on the basis of their place in the social status distribution: those coming from the 10% resp. 25% most disadvantaged families on one side, and those coming from the 10% resp. 25% most advantaged on the other. We now compare the absolute achievement level of those groups in PISA with the results for the corresponding social group in PIRLS. Table 5 confirms that early tracking seems indeed detrimental to the fate of socially disadvantaged students. The socially disadvantaged students score between 16,0 (25^{th} percentile) and 20,9 (10^{th} percentile) points worse on the PISA-scale if they have been subjected to an early tracking regime, after adjusting for performance in primary education. This clearly is a sizeable loss, as in PISA the effect of one year of schooling is estimated to be around 40 points (OECD 2013b). At the other end of spectrum, advantaged students seem to gain only very little (only a few points, indiscernible from zero) from early tracking. Hence, the observation that tracking boosts the social gradient seems to be mainly due to the loss that is suffered by disadvantaged students.

Table 5: Effect of tracking on the absolute achievement of different groups in the social status distribution.
Dependent variable: reading achievement score in PISA. Social origin in PISA measured by ESCS, in PIRLS by ESCS', with imputation, full sample. *** p < 0.01; ** p < 0.05; * p < 0.1

	10% most disadvantaged students	25% most disadvantaged students	25% most advantaged students	10% most advantaged students
Intercept	130.86	136.72	193.33	200.68
Achievement score in PIRLS	0.63***	0.63***	0.61***	0.61***
Early tracking	-20.86*	-16.07 (p=0.14)	3.03 (p=0.76)	2.49 (p=0.81)
R^2 (adj.)	0.39	0.46	0.59	0.56
N	31	31	31	31

Finally, we check whether similar relationships can be observed when we quantify social background by two of its ingredients separately (the educational level of the parents and the number of books at home). While this approach has the obvious disadvantage that it uses only part of the available information, it has the advantage that the separate characteristics (which have both been shown to be important aspects of social background) are defined completely comparable across both datasets. Table 6 shows that even when social origin is quantified by just one dimension, early tracking consistently leads to a stronger link between social background and achievement, although the effect is now somewhat less pronounced than before (possibly due to a loss of detail).

Table 6: Effect of social origin quantified by one of its dimensions only. Dependent variable: social origin effect in PISA. Measure of association: R^2, with imputation, full sample. *** p < 0.01; ** p < 0.05; * p < 0.1

	Social origin measured by educational level	Social origin measured by number of books at home
Intercept	3.44	5.99
Social origin effect in PIRLS	0.18*	1.03***
Early tracking	2.12**	1.72
R^2 (adj.)	0.28	0.67
N	32	33

Discussion and conclusion

In this paper, we studied how postponing the age of tracking in some countries may have succeeded in reducing the strength of the association between social background and achievement. In order to account for unobserved confounder bias and to acknowledge the fact that part of the social origin effect exists already in primary education, we applied a diff-in-diff-analysis to social origin and reading achievement data from PIRLS 2006 (primary education) and PISA 2012 (secondary education). Our results indicate that countries that pupils tracked at an early age undergo stronger effects of social origin on individual achievement in secondary school, net of differences existing before the tracking age. This pattern is consistently reproduced over all specifications, exploiting different measures of association, different social background variables and different operationalizations of the predictor variable. In particular, we observe that early tracking is detrimental to the educational opportunities of socially disadvantaged students, while it does not seem to affect the achievement of their more advantaged peers. These findings thus confirm, from a new methodological perspective, earlier findings on the negative impact of early tracking on equality of opportunities (cf. Bol & Van de Werfhorst (2013) for a review).

What do these findings teach us about the desirability of a comprehensivation of secondary education? Here, we would want to make three points. The first is that a large-scale international comparison such as ours has to rely on a relatively crude categorization of nation-specific educational practices. While we defined tracking in terms of the age of first selection, national practices are often more subtle than such a quantification suggests. For example, Dupriez, Dumay & Vause (2008) demonstrated that the different late-tracking countries have confronted the challenge of the resulting heterogeneous classrooms in different ways: while e.g. the Scandinavian countries adopted forms of individualized teaching (differentiated teaching, tutoring) to promote the learning of all students, other countries (e.g. France) 'solved' the challenge mostly through an increased use of grade retention. As the latter has its own undesirable consequences, a mere delay of the tracking age does not suffice to arrive at more equitable

outcomes (cf. Figure 1), but should be accompanied with efforts to raise the educational performance of disadvantaged students.

Similarly, even within an system of early selection the adverse effects of tracking can probably be mitigated to some extent. Firstly, tracking can be made less 'rigid' by facilitating promotion to a 'stronger' track at a later stage in the educational career. Secondly, the relation between track placement and overall cognitive development can be limited by leaving classrooms untracked for certain specific subjects (e.g. history or social science, cf. Van de Werfhorst (2014)). Thirdly, it has been argued that reliance on central examinations for track placement (instead of mere parental preference) and school quality control (making schools more eager to invest in lower-track students) reduces the effect of social background on academic achievement in tracked systems (Bol et al. (2014)).

Finally, note that the design of the educational system itself can probably not be seen as fully independent from its broader socio-economic context (Dupriez & Dumay (2006)). In recent decades many ties between the design of the educational system and that of the broader welfare state (Esping-Andersen (1990)) or economic system (Estevez-Abe (2001)) have been detected (Allmendinger & Leibfried (2003); Andres & Pechar (2013); Hega & Hokenmaier (2002); Peter, Edgerton & Roberts (2010); West & Nikolai (2013)). If educational systems, welfare provision and labour market layout form more or less coherent 'regimes', the logic of path-dependence might explain why educational systems confronted with common challenges have opted for their own specific answers (Green, Leney & Wolf (1999)).

However, even with this caution in mind, the present analysis, together with the earlier evidence, underlines the fact that educational structures, and in particular the design of secondary education, are important to understand the issue of equality of opportunity. In this sense, postponing the introduction of rigid tracking seems to remain a major imperative for educational system reform today.

Endnotes

[1] Note that the average coverage rate (i.e. the percentage of the population that is included in the sample design) is somewhat lower in PISA than in PIRLS: in some countries, a substantial proportion of the 15-year-olds has already left the education system. Very low retention rates might bias the estimation of social origin effects, as they would leave the most disadvantaged youngsters out of the sample. This could mainly be an issue for developing countries in which education at the age of 15 is not yet universal. In our sample, one country (Indonesia) indeed has a low retention rate for PISA (63%). Deleting this country does however not change our results (e.g. the estimate for the early tracking effect in Table 3 (with social origin in PIRLS measured by HER) would be 4.53*** instead of 4.63***).

[2] The coefficients of the first principal component of the PCA for the nine underlying social background variables were:

- Financial position of the family: 0,20
- Years of education (maximum of both parents): 0,46
- Number of books at home: 0,44
- Availability of PC: 0,44
- Availability of own study desk: 0,34
- Availability of own books: 0,25
- Availability of newspaper: 0,18
- Availability of own room: 0,25
- Availability of own mobile phone: 0,31

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CHAPTER 3 - SOCIAL INEQUALITIES IN EARLY SCHOOL LEAVING: THE ROLE OF EDUCATIONAL INSTITUTIONS AND THE SOCIO-ECONOMIC CONTEXT

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Abstract

Reducing the number of early school leavers, those who quit education without at least a high school degree, is a key objective of educational policy throughout Europe. Previous research has shown that in particular youngsters from disadvantaged families face relatively high risks of school dropout. In this paper we use data from the 2009 ad hoc module of the Labour Force Survey to examine how macro-level determinants influence school dropout risks among different social groups. Our results indicate that both the design of the educational system (tracking age, extent of vocational education) and characteristics of the socio-economic context (poverty rate, unemployment patterns) have an impact on the social distribution of the school dropout risk.

Introduction

In the Europe 2020 growth strategy, the European Commission (2010a) identified a reduction in the number of early school leavers as one of the five headline policy targets. An upper secondary certificate is regarded to be the minimal qualification needed to fully participate in modern society; for example, early school dropout dramatically increases the risk of unemployment, poverty and social exclusion (Solga, 2002).

In this article, we consider the issue of early school leaving from an intergenerational perspective. Previously, it has been shown that low educational attainment is often transmitted across generations. In particular, having low-educated parents drastically increases the odds of becoming a school dropout in every single European country (D'Addio, 2007). However, this relationship is not equally strong in different contexts; instead, its strength varies considerably across countries. In this paper, we will examine which country-level educational policies and socio-economic characteristics determine the strength of the link between parental background and the school dropout risk, using the data from the 2009 module of the Labour Force Survey.

Theoretical background

A double perspective on early school leaving

In the literature, two main perspectives on the occurrence of early school leaving have been developed. First, the educational life course perspective (Lamb et al., 2010) has conceptualised early school leaving as the endpoint of a problematic school career. This perspective views school dropout not as a single event, but rather as the result of a long history of poor academic achievement and disengagement from school. Indeed, longitudinal research has identified low achievement as the most important early predictor of school dropout (Alexander et al. 2001; Battin-Pearson et al., 2000). Moreover, students who are more engaged in school activities have been shown to face significantly lower risks of dropout (Finn, 1989; Fredricks, Blumenfeld, & Paris, 2004; Lamote, Speybroeck, Van Den Noortgate, & Van Damme, 2013). Complementary to the life course perspective, the rational choice perspective (cf. Becker, 1975; Breen and Goldthorpe, 1997) is more focused on the decision to leave school. From this perspective, the decision to drop out is regarded as a rational evaluation of the costs and benefits associated with staying in school. At the cost side, direct costs of staying in school (e.g. enrolment fees, costs of text books, transportation costs) are often dominated by indirect costs, in particular, opportunity costs: as students in

school often do not earn money, staying in school corresponds to lost income. On the benefits side, obtaining a qualification may lead to better employment chances and higher earnings later in life. Thus, according to this perspective, the balance between the costs and the anticipated benefits determines whether students stay on at school until graduation.

Social origin effects on educational attainment

In this paper, we will focus on how dropout risks are distributed across different social groups. Overall, social inequalities in educational attainment are a well-documented phenomenon. As the landmark volume of Shavit and Blossfeld (1993) has demonstrated, parental background has not ceased to influence educational outcomes in the industrialized world throughout the 20th century. On the other hand, the association has been shown to vary over time and between different countries (Breen and Jonsson, 2005). At least to some extent, the right mix of educational and social policies (Ross, 2009) seems to reduce educational inequalities.

The effects of social origin on educational attainment have often been broken down in so-called primary and secondary effects (Boudon, 1974). Primary effects refer to the observation that children from different social backgrounds perform differently in school (Van de Werfhorst and Mijs, 2010). This observation has been explained in a multitude of ways, including cultural disadvantages (e.g. lower-educated parents are less able to help their children with their school assignments) and economic constraints (e.g. disadvantaged families have less material resources needed to perform well at school, such as study-rooms or ICT equipment). Complementary to the primary effects, a secondary effect of social origin refers to the observation that even students who are at the same level of academic performance apparently make different educational decisions depending on their social background (Breen et al., 2009).

Both the primary and the secondary effects of social origin are expected to influence the social distribution of dropout risks. The primary effect on achievement leads children from different social classes through different educational life courses, culminating in different risks of dropout. The secondary effect leads children and parents from different social groups to different evaluations of the expected costs and benefits associated with staying on at school. For example, urgent financial constraints can make disadvantaged families perceive the balance between short-term costs and long-term benefits differently than more advantaged families.

The importance of the macro-context

In the literature on early school leaving, most of the attention has been directed towards identifying the individual risk factors predicting early dropout. This approach has generated valuable insights on possible school-level interventions to reduce dropout among students. However, as a recent literature review on the effectiveness of interventions against dropout concludes (Freeman & Simonsen, 2014, p. 44), '*there is a surprising lack of emphasis in the intervention literature on developing interventions that address larger community characteristics, such as poverty (…). Intervention research must go beyond the typical school boundaries to mediate these factors*.'

In this paper, we will approach early school leaving from a more systemic perspective, focussing on both the structural design of the educational system and on macro-level socio-economic characteristics. A recent example of the value of such an approach can be found in De Witte et al. (2013). Detecting several associations between time series on early school leaving rates from different European countries on the one hand and an array of educational and socio-economic characteristics on the other, De Witte et al. (2013) provided an argument for more systemic reforms on top of school-level interventions. In particular, De Witte et al. (2013, p. 340) demonstrated that '*a favourable socio-economic environment (economic growth, the prevention of youth unemployment, the fight against poverty and effective integration strategies for newly arrived immigrants) contributes to more successful school completion rates*'.

De Witte et al. (2013) limited their analysis to the effect of macro-level determinants on the *overall* dropout rates. However, it seems justifiable to add a focus on how such determinants would influence dropout risks among *different social groups*. As recently argued by Ross and Leathwood (2013), early school leaving is often only one aspect of a broader context of social exclusion and marginalisation. Hence, it does not only matter to what extent educational or social characteristics influence the overall dropout rate, but also to what extent they perpetuate social inequalities by reproducing low educational attainment and disadvantage over generations. Note that the empirical set-up of De Witte et al. (2013) relied on yearly data from the core questionnaire of the Labour Force Survey, which do not contain information on the parental background of the respondent. To investigate social inequalities, we will turn to a specific module added to the Labour Force Survey in the 2009 wave, which does contain such information (see below).

Macro-level determinants: literature review

Educational macro-level determinants

From the literature, two sets of structural determinants can be distinguished: a set of educational practices, and a set of socio-economic policies and circumstances (Kritikos and Ching, 2005). We will start with the former.

As dropout often occurs as the endpoint of an educational career marked by failure, it is particularly relevant to consider how the design of the educational system deals with disadvantaged or low achieving students (Lamb et al., 2010). A common response in many nations has been to separate low achievers from their academically more talented peers by placing them into less demanding tracks at an early stage in their career (10-14 years). It has been repeatedly shown that such early tracking increases the gap between strong and weak students (Hanushek and Woessmann, 2006) and between students from different social classes (Dupriez and Dumay, 2006; Duru-Bellat and Suchaut, 2005; Horn, 2009; Van de Werfhorst and Mijs, 2010), as it raises a number of structural barriers for disadvantaged students to proceed successfully (Husén, 1975). Hence, we expect that early tracking will also reinforce the effect of social background on the probability of graduation (Brunello and Checchi, 2007; Pfeffer, 2008).

At the same time, the vocational tracks which cater for the less academically inclined students may act as a safety net against dropout. In particular, when vocational education delivers specific skills highly demanded by the labour market it may provide access to relatively safe, well-paid jobs. In such cases, vocational education can act as an incentive to stay in school (Shavit and Muller, 2000; Teese, 2011). Note that a well-developed vocational education track seems particularly relevant in the upper secondary cycle (Bol and Van de Werfhorst, 2013), which can be combined with a comprehensive structure in lower secondary (such as in the Scandinavian systems).

Thirdly, it has been suggested that grade retention often amplifies problems of achievement and motivation instead of solving them (Jimerson et al., 2002). Students who have repeated grades are thus more likely to drop out early (Roderick, 1994; Stearns, Moller, Blau & Potochnick, 2007).

Finally, raising the legal school leaving age could work as a barrier against premature dropout (Cabus and De Witte, 2011). However, the international variation in the legal school leaving age is too low to provide convincing statistical checks in a comparative perspective.

Socio-economic determinants

The second set of determinants refers to the socio-economic context in which dropout decisions are made.

First, the opportunity cost of staying on at school - and thus foregoing potential income – depends on how easily young school leavers can find a job. Hence, a high youth unemployment rate is expected to decrease the dropout rates (see for example Petrongolo and San Segundo (2002) for Spain or Clark (2011) for the UK). However, whether high unemployment may have differential effects on dropout rates among different social groups is still a matter of debate. On the one hand, disadvantaged youth seem to be more sensitive to the prevailing labour market conditions, as the opportunity costs of staying in school are more heavily felt by those in financial need (Tumino and Taylor, 2013). On the other hand, disadvantaged children seem particularly sensitive to the damaging effect of economic crises on the educational aspirations of children (Rampino and Taylor, 2012). To the best of our knowledge, social differences in the impact of youth unemployment on school dropout have not yet been analysed in an international comparative study.

Another obvious socio-economic factor determining the risk of early school leaving is the poverty rate (Ensminger, Lamkin & Jacobson, 1996). First, widespread poverty may influence the primary effect of social origin on performance, e.g. through stronger material deprivation (more parents not being able to afford a computer, school books, a study room...). Secondly, poverty may influence the perception of (opportunity) costs: when poverty is more severe, additional income is more badly needed, and disadvantaged families may feel more inclined to give up long-term educational aspirations. It has also been argued that with a more acute threat of poverty, better-off parents will mobilize more of their resources to ensure that their children will stay ahead (European Group of Research on Equity of the Educational Systems, 2005).

A final determinant is the expected benefit that is associated with obtaining a high school qualification: do the advantages that the qualification will yield in the future outweigh the costs to be made to obtain it? In the literature several proxies have been employed to quantify the benefits of obtaining a qualification. Some scholars have used the adult unemployment rate, arguing that when adult jobs are scarce, the qualifications paving the way to them would also lose some of their value (‘discouraged student effect’, Tumino and Taylor, 2013). However, the validity of this proxy could be questioned, as it assumes that rising adult unemployment would affect everyone to the same degree, independent of the attained educational level. Obviously, this is not the case, as particularly better qualified groups are less threated by unemployment (Solga, 2002). In this sense, it could even be argued that rising adult unemployment would act as an incentive, not a discouragement, to obtain a qualification. Other approaches have used GDP/capita or GDP growth as proxies for the expected future benefits, arguing that

economic development would raise the demand for skilled labour and thus increase the labour market value of high school degrees (Cabus and Witte, 2012; Cabus and De Witte, 2013). However, a macro-economic figure such as GDP seems to be a somewhat crude indicator of differences in the value of qualifications across countries. For example, this proxy does not take into account that the value also depends on the design of the labour market, as countries differ in the extent employers rely on educational credentials when hiring employees (Gangl, 2001; Maurice, Sellier & Silvestre, 1986). In this paper, we will capture the expected benefits of qualifications in the labour market more straightforwardly by calculating the difference that a high school qualification makes on the labour marker for each country, i.e. we will use the odds ratio of having a job for adults with and without a high school qualification as the proxy for the expected benefits of this qualification.

Model specification

In order to examine the effects of educational and socio-economic factors on the dropout probabilities of individuals from different social groups, we will estimate a multilevel logit model. Multilevel models allow for the interaction between individual characteristics (parental background) and macro-level variables, while at the same time accommodating for the clustering of individuals within countries through the estimation of country level errors (Gelman and Hill, 2007). Our multilevel model takes the general form

$$Y_{ij} = a + b.S_j + \varepsilon_j + (a' + b'.S_j + \varepsilon'_j)*PB_{ij} + c.X_{ij}, \qquad (1)$$

in which Y_{ij} denotes the logit of the probability of school dropout of individual *i* in country *j*, PB_{ij} indicates parental background, S_j refers to (sets of) educational and socio-economic characteristics, X_{ij} is a vector of individual controls and ε_j and ε'_j are normally distributed random errors at the country level. Hence, if *b* is positive, then a higher value of the macro-variable S_j is associated with a higher dropout probability. Moreover, we define $PB_{ij} = 0$ for students who do not have at least one parent with a high school degree, $PB_{ij} = 1$ for those with at least one parent who finished high school, and $PB_{ij} = 2$ when at least one parent has a tertiary degree. Therefore, a negative estimate for the effect of PB_{ij} implies that dropout probabilities decrease when parents are higher educated, and more negative estimates correspond to stronger effects of parental background. Hence, a positive estimate for *b'* means that a higher value for S_j is associated with a smaller effect of parental background. Finally, note that we are working with a cross-sectional dataset with only limited time variability (see below) and, consequently, we cannot interpret any of these associations as causal effects.

Data definition

Micro-level

Data for all micro-level variables (i.e. Y_{ij}, PB_{ij} and X_{ij}) are drawn from the 2009 ad hoc module of the Labour Force Survey on Entry of Young People into the Labour Market (Eurostat, 2009) [1]. In line with the definition of De Witte et al. (2013), we define an early school leaver (ESL) as a person who has left the formal education system without having acquired a qualification of at least ISCED level 3 [2]. We include respondents aged 20-30 and use gender, age and having a foreign country of birth as individual controls. To account for different effects of immigration across countries, we allow the effect of foreign origin to vary randomly across nations.

Macro-level

The literature review suggested to collect macro-level data on three educational characteristics (tracking age, the extent of vocational education in upper secondary, and the incidence of grade retention), and three socio-economic determinants (youth unemployment rate, poverty rate, benefit of a high school qualification in terms of the odds on employment). As in the Labour Force Survey age data are aggregated into 5 year bands, we take the average of each macro-variable over 5 year bands; we assume that dropout decisions have been made when respondents were about 17 years old. For example, we use the averages over the period 2002-2006 as characteristic for the dropout context of the cohort aged 20-24 (in 2009). Finally, we standardize all macro-variables to have an average of 0 and a standard deviation of 1 across all countries.

Data on tracking age and on the incidence of grade retention among 15-years olds are derived from PISA (2003 and 2009 waves), while data on the percentage of upper secondary students in vocational education are derived from Eurostat. All data on the socio-economic macro-level determinants are derived from Eurostat. We define poverty in terms of the absolute material deprivation rate (i.e. not having adequate material resources). Results using the relative poverty rate (i.e. earning less than 60% of the median income) are equivalent, but weaker. Finally, the indicator reflecting the benefit of qualifications is defined as the odds ratio of unemployment between adults without and with a secondary qualification; the higher the value, the more difference a qualification makes.

Sample

The LFS ad hoc module contains data on 30 European countries. As we did not find sufficient information on the macro-level variables for Malta, Cyprus, and the UK, these countries were removed from the

sample. The sample sizes and the rates of early school leavers in the 27 remaining countries are presented in Table 1. The full sample consists of 141.178 respondents.

Table 1: Descriptive statistics. Data: LFS ad hoc module, 2009, 20-30 year olds

Country	Sample size	Early School Leavers Rate	Country	Sample size	Early School Leavers Rate	Country	Sample size	Early School Leavers Rate
AT	3,928	9%	**FI**	3,481	9%	**LV**	1,248	17%
BE	3,030	15%	**FR**	5,602	15%	**NL**	12,262	16%
BG	3,466	17%	**GR**	8,178	21%	**NO**	2,549	18%
CH	4,705	9%	**HU**	8,891	12%	**PL**	6,748	6%
CZ	5,390	6%	**IE**	9,675	16%	**PT**	4,460	40%
DE	4,512	13%	**IS**	633	23%	**RO**	6,195	20%
DK	1,840	18%	**IT**	1,5276	24%	**SE**	6,495	9%
EE	1,362	14%	**LT**	1,783	11%	**SI**	2,348	6%
ES	11,842	34%	**LU**	1,878	13%	**SK**	3,401	4%

Results

Model without macro-level determinants

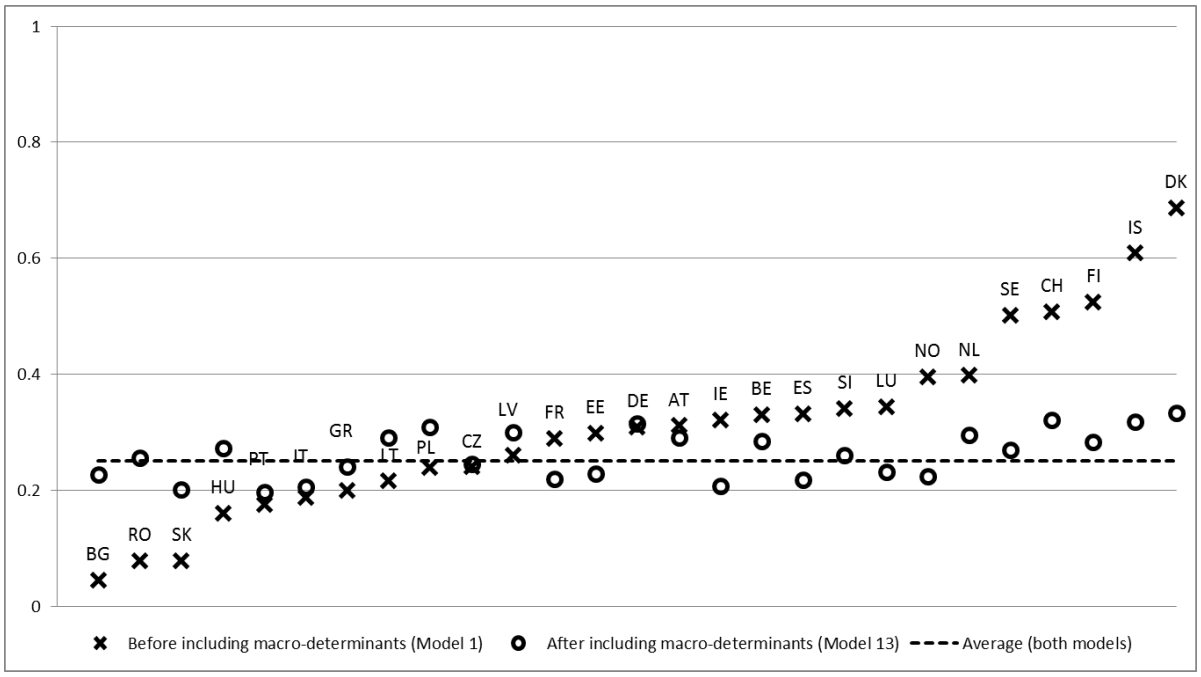
We now turn to examining which country-level determinants explain the strength of the effect of parental background on dropout risks. We start with a basic model which predicts early school leaving on the basis of individual characteristics, but without including any macro-level predictors. The results are presented in Model 1 in Table 2. The estimates indicate that being a female reduces the odds of school dropout, while being of foreign origin increases them. Importantly, the negative estimate of parental background indicates that having higher educated parents reduce the probability to become a school dropout. On average, the odds to become a dropout are multiplied by a factor of about 0.25 for each step upward in the parental background scale; the odds on dropout are thus divided by a factor 4 when shifting from low to middle educated parents or from low to high educated parents.

Table 2: Early school leaving in terms of micro-level characteristics and macro-level determinants. Dependent variable: early school leaving. Data: LFS ad hoc module, 2009, 20-30 year olds. *** p < 0.01; ** p < 0.05; * p < 0.1

	Educational determinants			**Socio-economic determinants**				**Educational + Socio-economic determinants**					
	1	2	3	4	5	6	7	8	9	10	11	12	13
Individual controls													
Intercept	-0.74	-0.74	-0.74	-0.73	-0.72	-0.72	-0.71	-0.74	-0.72	-0.73	-0.72	-0.72	-0.71
Female	-0.45***	-0.45***	-0.45***	-0.45***	-0.46***	-0.45***	-0.46***	-0.45***	-0.46***	-0.45***	-0.45***	-0.46***	-0.46***
Age	-0.02	-0.01	-0.01	-0.01	-0.02	-0.06	-0.05	0.02	-0.01	-0.04	-0.02	0.00	-0.04
Foreign origin	0.71***	0.64***	0.64***	0.68***	0.73***	0.72***	0.75***	0.61***	0.72***	0.63***	0.64***	0.73***	0.74***
Parental background	-1.34***	-1.34***	-1.34***	-1.36***	-1.36***	-1.34***	-1.37***	-1.36***	-1.36***	-1.34***	-1.36***	-1.38***	-1.36***
Determinants													
Tracking age		-0.03	-0.03					-0.06	0.01	-0.21*	-0.20**	-0.01	-0.15
Relative extent of VET		-0.14	-0.14					-0.18**	-0.15	-0.18**	-0.19**	-0.16*	-0.17**
Grade retention			0.02										
Youth unemployment rate				0.16**			0.05	0.18**			0.15**	0.07	
Material deprivation rate					0.31**		0.27**		0.31***			0.27**	0.27***
Importance of qualifications on LM						-0.25***	-0.18**			-0.31***	-0.27***		-0.25***
Interaction with parental background													
Par. backgr. * Tracking age		0.27*	0.31**					0.40***	0.17*	0.43***	0.45***	0.26***	0.25***
Par. backgr. * Relative extent of VET		-0.02	-0.02					0.05	-0.01	0.01	0.03	0.01	-0.01
Par. backgr. * Grade retention			0.14										
Par. backgr. * Youth unemployment rate				-0.32***			-0.13*	-0.44***			-0.40***	-0.23***	
Par. backgr. * Material deprivation rate					-0.63***		-0.55***		-0.60***			-0.46***	-0.57***
Par. backgr. * Importance of qualifications on LM						0.12	-0.03			0.26**	0.15*		0.14*
Model characteristics													
N	27	27	27	27	27	27	27	27	27	27	27	27	27
Pseudo-AIC	10,246	10,242	10,244	10,241	10,215	10,243	10,215	10,224	10,211	10,236	10,216	10,205	10,207

However, this average value masks large differences between countries. The variance components of the model (i.e. the estimated variance of the random terms ε_j and ε'_j) are markedly larger than their standard errors (for the intercept: 0.71, with a SE of 0.11; for the slope of parental background: 0.55; with a SE of 0.09). This indicates that there is relevant cross-country variability, both in the absolute dropout rates and in the social origin effects and that a multi-level model is appropriate. To present this more illustratively, the estimated residual terms for the slope (i.e. the country-specific deviation from the average value of -1.34) were converted into odds ratios and plotted as crosses in Figure 1. This figure shows that the average effect on the odds ratio of dropout of each step upward in the parental background scale (which was 0.25 on average) can be broken down in country-specific odds ratios ranging from 0.05 in Bulgaria to 0.69 in Denmark. Put otherwise, shifting from having low- to medium-educated parents reduces the dropout odds by a factor 20 in Bulgaria, as against a factor 1.5 in Denmark. In particular, the Nordic countries (Denmark, Finland, and Iceland) show relatively low levels of inequality in risks, while a number of Southern and Central-European countries record high inequality levels.

Figure 1: Country-specific deviations from the estimated average odds ratio on dropout for each step upward in the parental background scale, both before including any macro-level determinants (Model 1) and after including a number of macro-determinants (Model 13). Odds ratios closer to 1 indicate smaller effects of parental background. Data: LFS ad hoc module, 2009; 20-30 year olds.



The other twelve models in Table 2 include the different macro-level determinants (tracking age, the relative share of vocational education, grade retention, youth unemployment rate, material deprivation rate, the importance of qualifications in the labour market). The results are presented in three blocks of rows. The first rows list the effect of individual characteristics (gender, age, foreign origin, parental background) on the dropout probability. In all models the estimates are very similar to Model (1). A

second block of rows represents the *main effect* of the macro-level determinants, i.e. *b* in specification (1). The third block of rows represents the impact of the macro-level determinants on the effect of parental background, i.e. *b'* in specification (1). Recall that as the dependent variable is the logit of the dropout probability, a positive estimate for *b* means that an increase in the value of the macro-variable is associated with an increase in the odds of dropout, while a positive estimate for the interaction term *b'* means that a higher value of the macro-variable is associated with a smaller effect of parental background on dropout.

Educational determinants

The first important finding of the analysis is that a later tracking age seems to be associated with a lower effect of parental background on early school leaving. This effect is consistent across all specifications, with significant effect sizes. This finding confirms the expectation from the literature, which has shown that early tracking increases the effect of parental background on academic performance (Dupriez and Dumay, 2006; Duru-Bellat and Suchaut, 2005; Horn, 2009; Van de Werfhorst and Mijs, 2010) and on educational attainment (Brunello and Checchi, 2007; Pfeffer, 2008). The effect of tracking age on the absolute dropout probability is small; it reaches significance only in two models.

Secondly, the extent of vocational education (in upper secondary) is consistently negatively associated with the overall dropout rate; the estimates are significant in most specifications. This confirms the expectation that vocational education acts as a safety net, encouraging young people to stay on at school because of the attractive labour market returns of vocational degrees (Shavit and Muller, 2000), although a reverse interpretation (an expansion of the vocational sector to absorb a growing number of youngsters staying longer in education) can also be part of the explanation. The safety net of vocational education seems to work for everyone to the same degree, as there is no clear interaction with parental background.

Finally, the grade retention rate has no clear effects, neither on the overall dropout rate nor on the effect of parental background. Note that earlier findings on the micro-level consistently showed that grade retention is an important predictor of *individual* drop-out (Jimerson et al, 2002; Roderick, 1994; Stearns, Moller, Blau & Potochnick, 2007). Apparently, this does not translate in any association between the aggregated grade retention rate and the aggregated dropout rate at the country level. A possible explanation is that in countries that make less extensive use of grade retention, problems of underachievement and disengagement are not always adequately dealt with neither.

Socio-economic determinants

Concerning the effect of the socio-economic context, we would first expect high youth unemployment to be associated with a lower dropout rate, as the pull effect of the labour market decreases when jobs are sparser (De Witte et al., 2013; Rumberger, 1983). However, the models in Table 2 show that a high youth unemployment rate seems not to be associated with a lower dropout probability among disadvantaged students (reference group). However, there is a strong interaction effect between youth unemployment and parental background, which means that youth unemployment does have the expected effect for respondents with middle and high educated parents. These tendencies seem to support the argument developed by Rampino and Taylor (2012) which states that in times of economic crisis, mass youth unemployment particularly seems to damage the educational aspirations of disadvantaged students, and these reduced educational aspirations seem to outweigh the effects of the lower job availability. The educational aspirations of students with high educated parents are less sensitive to short-term economical fluctuations, and for this group the availability of jobs (decreased pull) seems more important. However, note that the reverse interpretation cannot be excluded, i.e. the youth unemployment rate may also react to changes in the inflow of unqualified school-leavers on the labour market.

From all socio-economic determinants, the effects of poverty rate are the strongest. The material deprivation rate, i.e. the proportion of people living in materially inadequate circumstances, seems to be intensely associated with a high dropout rate among disadvantaged respondents and with a strong effect of parental background. In all model specifications, the estimates are significantly negative and the (standardized) estimates are larger than that of the any other variable. The strength of the effect of poverty on dropout among disadvantaged students may be explained by the fact that poverty determines their trajectory in a multitude of ways. First, when poverty is severe, disadvantaged families may lack even the essential resources to give children a fair chance at school (for example, a study room), which may increase the gap with better-off students. At the same time, poorer families badly need the additional income which could be earned by a school leaver, and hence the pull of the labour market becomes stronger. Note that even when we wouldn't expect strong effects of poverty among high-educated families (since these are often situated near the top of the income distribution), it is interesting to see that a high poverty rate apparently is associated with a *lower* dropout among children of well-off parents (the interaction effect is much larger than the main effect). This seems to confirm the suggestion that in times of economic harshness well-off parents invest more of their resources to secure a strong educational position for their children (European Group of Research on Equity of the Educational Systems, 2005).

Finally, the main effect of our indicator for the benefits of a qualification is always significantly negative. This means that when high school qualifications matter more in the labour market (qualifications lead to

better job chances), students seem to be more inclined to stay at school. The interaction effect with parental background is less clear, with some estimates suggesting that the effect is less strong for advantaged students, but the estimates are not always consistent.

Explanatory power

In order to assess how well the different macro-variables explain the differences between countries that were observed before, the country-specific deviations from the average slope that persist *after* including macro-level determinants (i.e. the residuals estimated in Model 13, converted into odds ratios) were added as circles to Figure 1. Apparently, the large discrepancies that existed between countries in the parental background effect are drastically reduced when differences in the macro-level determinants included this model (tracking age, relative extent of VET, poverty rate, and importance of qualifications) are taken into account: the circles are distributed far more narrowly around the average than the crosses.

Educational or socio-economic interventions?

One of the long-standing issues in educational research concerns the role that education can play in equalizing educational opportunities in an unequal society. For example, in his volume *Equality* from 1931, the social critic R. H. Tawney (1951, p. 142) already compellingly claimed that schools could never stand up to such high expectations '*as though opportunities for talent to rise could be equalized in a society where the circumstances surrounding it from birth are themselves unequal!*' More recently, the potential of educational reforms to reduce the strength of the parental background has been called into question. Instead, it has been increasingly argued that it is not educational reforms but rather an equalisation of cultural and economic resources that are the prerequisite for educational equity (Erikson and Jonsson, 1996; Esping-Andersen, 2004; Shavit and Blossfeld, 1993). Further note that educational and socio-economic determinants are often correlated (Allmendinger and Leibfried, 2003; Hega and Hokenmaier, 2002; West and Nikolai, 2013); in particular, educational reforms, like the 'comprehensivisation' of lower secondary education in Scandinavia, often have been designed as part of a larger welfare policy towards a more egalitarian society (Antikainen, 2006).

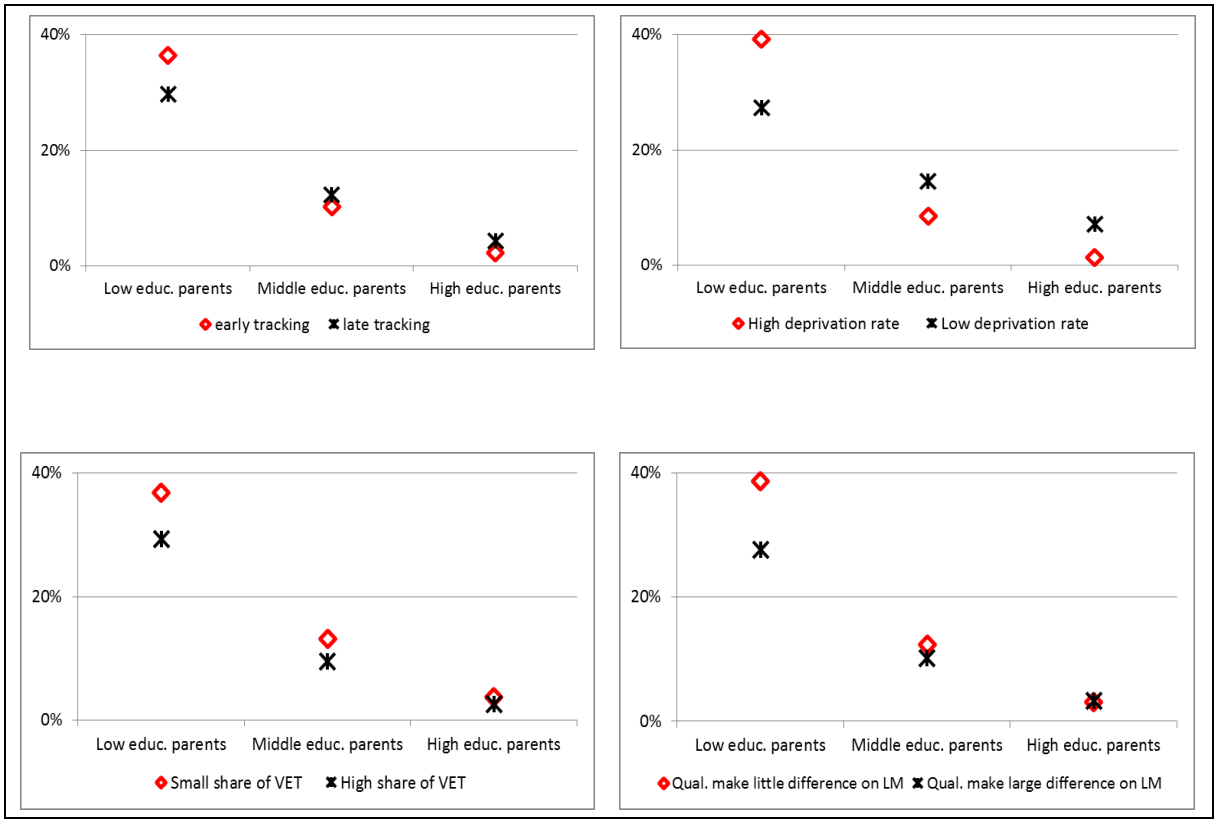
Previously, the effects of the educational system and the effects of the socio-economic environment have been often studied in isolation. For example, when Brunello and Checchi (2007) studied the effect of the educational tracking policy on social inequality in high school dropout, they controlled for the confounding effects of other educational characteristics (such as the extent of vocational education), but they did not take into account the socio-economic context. However, as the analysis in this paper

demonstrates, the context does play an important role in understanding the dropout probabilities of disadvantaged students.

Our present analysis enables us to disentangle the effects of both educational and the socio-economic features. First, the observed effects have proven robust against mutual control. For example, both the tracking age and the poverty rate seemed associated with the strength of the parental background effect, and these effects persisted in those models that contained both determinants (Model 9, 12, and 13). To illustrate the size of the effects of different characteristics in a model with mutual control, Figure 2 plots the estimated impact of the four macro-variables that were included in Model 13, i.e. tracking age, relative extent of VET, poverty rate, and importance of qualifications, on the dropout rates of children from different social groups. For each macro-variable, the estimated dropout probabilities are plotted for two situations: one in which the value of the macro-variable is one standard deviation above the country-wide average, and another where this value was one standard deviation below average (all other things being equal). The figure demonstrates that both the educational and the socio-economic characteristics have sizeable effects, also after mutual control: tracking and poverty clearly affect the slope of parental background, while the extent of vocational education and the importance of qualifications influence the absolute level of dropout. At the same time, a clear effect of parental background remains in all situations.

Considering the above results, adjusting the design of the educational system certainly seems to have its effect on equalization of opportunities, in addition to the effect of broader welfare policies. In this sense, the hypothesis that prior equalization of socio-economic conditions in society at large is a *conditio sine qua non* to achieve greater equality of educational opportunities (Esping-Andersen, 2004) seems not entirely true: there is certainly room for improvement within the educational system as well. On the other hand, there is no doubt that the socio-economic context plays an important role in equalising educational outcomes (Bryan, 2005). Hence, our findings strongly connect to an observation put forward by T. Husén (1973, p. 164) that '*there is a growing realization that educational reforms must be coordinated with social and economic reforms. Indeed, it is impossible to establish better equality of opportunity in the educational system without its being established previously or simultaneously in the overall prevailing social system*.'

Figure 2: Estimated impact of the four macro-variables from Model 13 on the dropout rates of children from different social groups. For each macro-variable, the estimated rate is plotted for the situation where the value is one standard deviation above resp. below the average across all countries. Data: LFS ad hoc module, 2009; 20-30 year olds.



Conclusion

In this paper we use data from the 2009 ad hoc module of the Labour Force Survey to examine the impact of macro-level socio-economic and educational determinants on the social distribution of early school dropout risks. The results concerning the effect of educational system characteristics are twofold. Firstly, a large vocational sector in upper secondary education functions seems to act as a safety net against dropout by offering less academically inclined students a valuable alternative with relatively attractive labour market prospects. Secondly, while early tracking has no consistent effects in terms of average dropout rates, it is consistently associated with a larger effect of parental background.

In regard to the influence of the socio-economic context, we find a strong effect of the poverty rate on social inequalities in early school leaving: children from low-educated parents are far more likely to drop out when poverty is high. High youth unemployment is also associated with high dropout probabilities for

disadvantaged students. Finally, we detected an inverse association between dropout rates and the returns on academic qualifications (in terms of reduced unemployment risks) in adult life.

The approach taken in this paper considered early school leaving not just as an individual issue, to be prevented by school-level interventions, but rather as a phenomenon that is strongly mediated by a number of macro-level features. Consequently, our results may inform educational policy about how altering the organizational design of the educational system may complement school-level interventions against dropout (Lee & Burkam, 2003). At the same time, our findings show that social inequalities in educational attainment are not only a result of the way the educational system functions, but also of socio-economic inequalities outside the reach of schools.

A major drawback of our research design is that we had to use a cross-sectional dataset, which impedes making strong causal claims. For some of our macro-level determinants, bidirectional mechanisms are not unlikely. For example, the correlation between school dropout and youth unemployment may be attributed to the pull effect of the labour market on students, but may also be reflect the difficulties to integrate unqualified school leavers into the labour market. A step forward for future research could be to test the relationships observed in this study on (national) longitudinal datasets.

Endnotes

[1] Another recent dataset which contains data on parental background and qualification level is PIAAC (2012), a survey organised by the OECD in 22 countries (both from inside and outside Europe). Moreover, this dataset contains measures on the skill level of respondents. However, we prefer to use the Labour Force Survey module because this has information on all European Union Member states and because sample sizes for the corresponding cohorts are on average about five times larger.

[2] Note that this definition differs from the official definition of Early School Leaving (EU-ESL) by the European Commission (European Commission 2010b), as explained by De Witte et al. (2013). In fact, EU-ESL refers to a subset of ESL as we define it here; the official definition counts only those ESL who did not participate in any kind of non-formal training in the four weeks before the survey. Non-formal training refers here to all courses, seminars, conferences, private lessons or instructions outside the regular education system, both job-related and for personal purposes. There are two problems with this official definition (see De Witte et al., 2013). First, the primary policy target is lack of qualifications, not the occasional participation in non-formal training, which is so broadly defined that it includes also small courses for personal purposes that are far less important in terms of long-term consequences. Secondly, because non-formal training refers to such a vaguely defined spectrum, this component is likely to generate extra noise in the figures.

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CHAPTER 4 - RETURNS TO VOCATIONAL EDUCATION OVER THE LIFE CYCLE: BETWEEN IMMEDIATE LABOUR MARKET PREPARATION AND LIFELONG EMPLOYABILITY

Abstract

An important issue in the design of educational systems is the balance between delivering general and occupation-specific skills. On one hand, vocational oriented programmes, providing occupation-specific skills with immediate labour market relevance, have been repeatedly shown to secure safe pathways into employment. On the other hand, these programmes tend to put less emphasis on developing general skills, such as literacy, that are foundational to lifelong learning. Hence, when the needs of the labour market change, vocational-educated employees risk being less flexible in adapting to such changes. In this article, we examine whether this results in a trade-off between short-term gains and long-term losses by considering differences in the labour market careers of vocationally and generally educated respondents in PIAAC (2012). Our results confirm that early labour market benefits of vocational specialisation decrease over time; we relate this to its lower versatility.

Introduction

Preparing students for the world of work is usually considered to be one of the key functions of educational systems (alongside the production of knowledge and skills, personal development, and the promotion of citizenship) (Van de Werfhorst (2014)). Throughout the industrialised world, educational systems, in particular at secondary level, have developed different approaches to stand up to this task. These answers can be roughly divided into two categories (Allmendinger (1989)): whereas education systems in the Anglo-Saxon world are mostly oriented towards supplying a high level of general skills, with labour market preparation often taking place only after graduation from High School, European-continental countries have instead developed a large segment of vocational secondary education, explicitly oriented towards supplying occupation-specific skills (Ryan (2003)).

How does secondary vocational education affect labour market outcomes? A long tradition of research on the transition of young graduates into the labour market has identified clear advantages of vocational education at the start of the career (Müller &Shavit (1998); Shavit & Muller (2000); Müller & Gangl (2003); Breen (2005); Iannelli & Raffe (2007); Meer (2007); Van de Werfhorst (2011)). Vocational education seems to reduce unemployment risks in the first years after labour market entry as it provides young school leavers with skills of immediate value in the workplace. On the macro-scale, the success of vocational education in smoothing labour market transitions has been related to low youth unemployment (Gangl (2001)) and to stable employment patterns among labour market entrants (Allmendinger (1989)).

However, the scope has mostly been limited to labour market entry. It is far from evident that vocational education would preserve its advantage in the longer run. In particular, it has been argued that the occupation-specific skills delivered by initial education bear the risk of becoming obsolete over time, as labour market demands and occupational requirements are changing incessantly, for example due to technological developments (Bowman (1993)). General education, by contrast, is then argued to produce more flexible employees, equipped with a broad base of foundational skills that facilitate lifelong participation in training and reskilling (Gamoran, Raffe & Rosenbaum (1998)). Indeed, participation in lifelong learning has been shown to depend strongly on a decent foundation of basic skills such as numeracy and literacy (Desjardins, Milana & Rubenson (2006); Desjardins & Rubenson (2013)), as well as on positive dispositions towards learning developed during initial education (Cornford (2002); Illeris (2003)).

In this regard, the assumed rigidity of vocational education has been related to differences in labour market performance between the Anglo-Saxon and the European-continental world (Goldin (2001)). For

example, Krueger and Kumar (2004) argue that the slow-down in the economic growth across the European continent might be related to its slower adoption of new technologies as a consequence of the lower flexibility inherent in vocational-oriented systems. However, attributing cross-country differences in economic performance to differences in educational system orientation is certainly not unproblematic; for example, it has been argued that the design of the educational system cannot be seen as independent from other policy areas, such as the regulation of the labour market and social protection schemes (Esping-Andersen (1990), Estevez-Abe (2001), West & Nikolai (2013)). Still, the suggestion that the short-term gains of vocational education might be traded-off against longer term losses deserves further examination.

In this article, we will approach this issue on the micro-level by exploiting the fact that in vocational-oriented systems, only part of the cohort engages in vocational education: a sizeable share of the cohort follows a general track instead. How do labour market careers differ between those with a general and those with a vocational education background? A number of recent studies on the national level has indeed suggested that the individual benefits of vocational education, such as higher employment probabilities or wages, disappear with age. For example, Korpi, De Graaf, Hendrickx and Layte (2003) show that vocational education reduces unemployment risks, but only during the very first years on the labour market. Similarly, both Cörvers, Heijke, Kriechel and Pfeifer (2011) and Golsteyn and Stenberg (2014) demonstrate that vocationally educated employees earn more in the initial phase of their careers, but those with a general education catch up after about eight resp. ten years.

While the studies cited above focused on a limited number of countries, we will broaden the scope to a larger number of vocational-oriented systems. Moreover, we will consider whether these trends can be related to lower participation in lifelong learning among vocational-educated respondents. To date, Hanushek, Woessmann and Zhang (2011), who used data from the International Adult Literacy Survey (IALS, 1994), provide the best example of such an approach. While their work, which also reported decreasing benefits of vocational education for older respondents, will be a major inspiration for our article, we will make a number of important adjustments to their empirical strategy (see below), while also updating their findings using more recent data from the Programme for the International Assessment of Adult Competencies (PIAAC, 2012) and enriching it with some novel elements, in particular regarding lifelong learning behaviour.

Empirical strategy

Overall, returns to education can be determined by estimating a Mincer (1974) model of the form

$$Y_i = a + b*Exp_i + c*Exp_i^2 + d*Edu_i + \varepsilon_i \quad (1)$$

in which Y_i is a labour market outcome (usually the logarithm of earnings), Edu_i a measure of educational attainment (usually the number of schooling years), and Exp_i the years of potential work experience (which has usually been shown to have a curvilinear effect on returns to education). This model has been extensively applied (see Trostel, Walker & Woolley (2002), Harmon, Oosterbeek & Walker (2003), and Psacharopoulos & Harry (2004) for some examples), typically leading to returns somewhere between 5 and 10% (higher earnings) for each additional year of schooling.

In this article, we will adapt the Mincer function in the following ways. First, instead of comparing the effect of additional school years, we will compare the effect of the orientation of the programme itself (general resp. vocational), restricting ourselves to programmes at secondary level. Secondly, we will not only consider the effect of vocational education on the earnings of respondents, but also on their employment probability. Indeed, labour market outcomes of vocational education can be expected to depend on the choice of the outcome variable, as vocational education typically prepares for secure but less prestigious jobs (Shavit &Muller (2000)). Thirdly, we will allow for interactions between the orientation of the programme and potential experience (and its square), in order to consider how returns to educational programmes might change over the labour market career. Hence, our basic model will look like

$$Y_{ij} = a1 + a2*Exp_{ij} + a3*Exp_{ij}^2 + Vocational_{ij}*(b1 + b2*Exp_{ij} + b3*Exp_{ij}^2) + \varepsilon_{ij} \quad (2)$$

in which the standard errors are clustered by country to accommodate for the clustered nature of the international dataset.

There are however two major problems with this approach. First, allocation to educational programmes is not random: those who opt for general education are usually of higher cognitive ability than those who enrol in vocational education (Van de Werfhorst & Mijs (2010)). Hence, do the observed differences in labour market outcomes reflect the effect of the educational programmes, or do they rather reflect differences in their intake? This problem, well-known in the literature as the selectivity bias problem (Griliches (1977); Card (1999)), has been solved in different ways in the literature. A first line of research has exploited policy changes that affected the weight of general education in the educational system at a particular point in time (see Malamud &Pop-Eleches (2010) for an example from Romania). A second

option is to rely on longitudinal data to include a measure of early ability, measured prior to programme enrolment, in the model (Harmon, Oosterbeek & Walker (2000), Meer (2007)). Due to the unavailability of such data for many countries, in this article we will instead follow a second-best approach by controlling the currently observed ability (numeracy and literacy test scores) of the respondents. Such a control is expected to reverse the bias in the model: whereas without the control, estimates for vocational education (as compared to general education) can be expected to be downward biased (due to lower selectivity), they can be expected to be upward biased once currently observed ability is controlled for. Indeed, while current skills are correlated to pre-enrolment ability (cf. Denny, Harmon & O'Sullivan (2004); Hanushek & Zhang (2006)), they are also in part a consequence of choosing a certain educational programme. As general tracks put more emphasis on the development of general skills, controlling currently observed ability could be expected to remove part of the expected positive effect of general education. Our approach thus can be used to check the robustness of our findings by establishing a sort of lower and upper bounds for the benefits of vocational education.

Secondly, we will deal with cross-country-differences (e.g. in their macro-economic climate) by including country fixed effects (both as linear effects and in interaction with experience and its square). However, correcting for national characteristics might conceal some of the value of vocational oriented systems too: it has been repeatedly argued that the more educational systems invest in vocational education, the more employers become interested in training provision, the more school-to-work-linkages are strengthened, and the more education pays off in the labour market (Müller & Shavit (1998), Ainsworth & Roscigno (2005), Iannelli & Raffe (2007); Van de Werfhorst (2011)). Again, results with and without country controls will be reported to assess the robustness of our findings.

In sum, this thus leads to the extended model:

$$Y_{ij} = a1 + a2*Exp_{ij} + a3*Exp_{ij}^2 + Vocational_{ij}*(b1 + b2*Exp_{ij} + b3*Exp_{ij}^2)$$

$$+ Skill_{ij}*(c1 + c2*Exp_{ij} + c3*Exp_{ij}^2) + Country_j*(d1 + d2*Exp_{ij} + d3*Exp_{ij}^2) + \varepsilon_{ij} \quad (3)$$

As stated above, this strategy is largely similar to the analysis by Hanushek, Woessmann and Zhang (2011). However, there are also some important differences. First, we choose to focus on the secondary level, for which the data explicitly distinguish between general and vocational programmes. By contrast, Hanushek, Woessmann and Zhang (2011) consider tertiary degrees as well, by equating qualifications at the ISCED-level 5A and 5B to 'general' respectively 'vocational' tertiary degrees. However, we believe such a distinction might be inadequate; in particular it should be noted that this categorization was not reported very consistently across countries (for example, in the Netherlands almost all tertiary level degrees were reported as ISCED 5A). Secondly, while we will consider trends in the returns to a qualification in terms of the time passed since this qualification was obtained, Hanushek, Woessmann and

Zhang (2011) only refer to the current age of the respondent. However, current age might be a poor proxy, as average graduation ages differ between countries (OECD (2014)). Thirdly, Hanushek, Woessmann and Zhang (2011) interact vocational orientation only with the linear age term, not with the quadratic age term. However, there is no good reason to assume that when vocational education affects employment or earnings profiles, this would only influence the linear component of the profile. Hence, we will interact vocational orientation (and, when appropriate, skills) also with age square. Similarly, Hanushek, Woessmann and Zhang (2011) include only linear country fixed effects, while national features (for example, early retirement regulations) might also affect employment and earnings profiles over the career. Hence, we will also include interactions between the country effects and age and its square.

Data

We will estimate our model on data from the Programme for the International Assessment of Adult Competencies (PIAAC), which contains background information and skill scores (numeracy, literacy) collected by the OECD in 23 countries during 2011-2012. We exclude four countries because of data issues (Australia, Canada, Russia, and Estonia) and six countries which have a weakly developed vocational system at secondary level (USA, Japan, Korea, the UK, Ireland and Spain): these countries often lack a sharp institutional divide between vocational and general education, leading to ambiguous data definitions (cf. results for the UK in Cörvers, Heijke, Kriechel & Pfeifer (2011)). The sample is further limited to male respondents (to exclude national differences in female labour market integration), aged 20 to 65 years, who report a secondary or post-secondary degree (ISCED 3 or ISCED 4) as the highest qualification achieved. We further exclude foreign-born respondents and respondents who are still in formal education. Finally, we give equal senate weights to all countries. Sample sizes and descriptive statistics are reported in Table 1.

Table 1 – Sample sizes and descriptive statistics. Data: PIAAC, 2012; age 20-65.

Country	Sample size	Share with vocational qualification (%)	Country	Sample size	Share with vocational qualification (%)
AT	1,186	93.3	**IT**	848	22.9
BE	944	29.3	**NL**	700	81.8
CZ	1,507	97.7	**NO**	748	77.1
DE	1,007	97.7	**PL**	2,057	91.5
DK	1,142	76.9	**SE**	867	48.4
FI	1,027	88.6	**SK**	1,509	50.9
FR	1,262	82.5	**Total**	14,804	74.0

The orientation of each qualification is defined by considering the share of the content that is oriented towards a specific class of occupations or trades (with a cut-off point at 25%). The currently observed skill level is defined as the standardised average of the first plausible value of the numeracy and literacy assessment scores. The years of potential experience are calculated as the difference between the current age and the reported graduation age (for Austria and Germany, which do not report individual graduation ages, these are imputed with the average national graduation age from OECD (2014)).

The first labour market outcome under study is whether the respondent was employed at the time of the survey, which is to be estimated with a logistic model. The second outcome refers to the hourly earnings of salary earners and self-employed respondents, which are expressed as a relative position (decile) in the earnings distribution for each country, and which will be estimated with an ordered logit model.

Finally, we will examine a possible mechanism behind time trends in returns to education by considering participation in lifelong learning. PIAAC contains information about whether or not the respondent participated in lifelong learning over the preceding year, which can be used to assess differences in participation between different social groups (cf. Desjardins, Milana & Rubenson (2006); Rubenson & Desjardins (2009); Boeren, Nicaise & Baert (2010); Rees (2013); Desjardins & Rubenson (2013)). However, this measure also has some shortcomings; for example: the demarcation of lifelong learning activities has been shown to differ between countries (Lavrijsen & Nicaise (2015)), while the one-year reference period might be too short to assess longer-term relationships with labour market outcomes. Hence, we will also use more sophisticated information available in PIAAC measuring the attitudes towards learning (readiness to learn) of the respondent . Dispositions towards learning have indeed been shown to be strongly related to lifelong learning participation (Beder (1990); Cross (1981); Crossan, Field, Gallacher & Merrill (2003); Ellsworth (1991); Hayes (1988)) and may thus act as a proxy of adults' long-term training propensity.

Results and discussion

Employment probability

Table 2 reports the estimates for the logistic model predicting the employment probability as a function of potential experience, the vocational nature of the highest qualification achieved, and the current skill level (standardised). In model 1 to 3 no country fixed effects are included, in model 4 to 6 both linear country fixed effects and their interactions with experience and experience square are included. The effect of having a vocational degree (models 1 and 4) and the effect of the standardised skill test score (models 2 and 5) on the probability to have a job are estimated in separation, before including them simultaneously (models 3 and 6). The table also includes an indication of the turning point at which having a vocational rather than a general qualification becomes a disadvantage instead of an advantage, all other things being equal. To facilitate comprehension of these models, Figure 1 reports a graphical representation of some basic findings.

First, Model 1 shows a clear benefit of vocational secondary education, relative to general secondary education, at the start of the career (Figure 1A). This positive main effect of vocational orientation is reproduced in all specifications: vocational education thus secures relative safe pathways into employment. This protective value seems to be somewhat larger in the models that do not control for differences between the countries in our sample, which could be explained by the fact that the countries with the highest share of vocational graduates (Germany, Austria) also show the strongest institutional linkages between education and work.

Secondly, potential experience has an inverted U-effect on employment probability, as employment is least secure in the first and last years of the career. However, there is a significant difference in the employment profiles of respondents with vocational and general qualifications. In particular, the protective value of vocational education against unemployment, relative to general education, diminishes over the labour market career. For example, in Model 1, general education graduates start to enjoy higher employment rates, relative to vocational graduates, about 12.7 years after graduation. This tendency is reproduced in all specifications: although the precise timing of the turning point depends somewhat on the model specification, general education graduates outperform their vocational education counterparts in terms of employment probability somewhere in the second decade after graduation. This confirms the central hypothesis of this article: while good occupation-specific skills may be very important at the start of the career, they risk losing part of their relevance over time.

Thirdly, numeracy and literacy skills are not only important at the start of the career, but their protective effect against unemployment even increases slightly in the last stages of the career (Figure 1B). Hence,

while the specific skills offered by vocational education tend to depreciate over time, the reverse seems to be true for general skills.

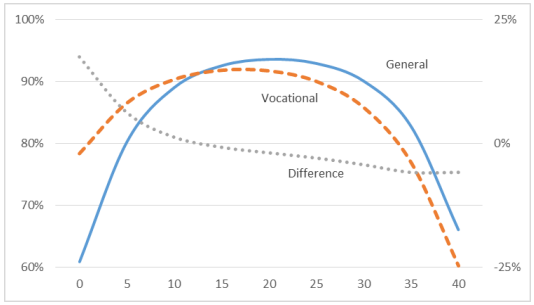
Finally, controlling out currently observed skills improves the value of vocational education at labour market entry and slightly attenuates its depreciation over time (see Model 3 and 6), shifting the turning point a few years upwards. However, remember that controlling out currently observed skills not only corrects for the lower selectivity of vocational education relative to general education, but that it also takes over some of the benefits that come predominantly with general education. In this sense, the estimated advantage of a general over a vocational qualification in models 3 to 6 is downward-biased and should be seen as a lower bound estimate (see Figure 1C).

Table 2 – Effect of having a vocational qualification on employment probability. Data: PIAAC, 2012.
***p<0.01, **p<0.05, *p<0.1

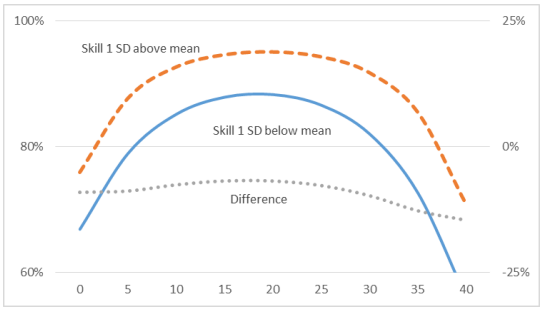
	Without country fixed effects			With country fixed effects		
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Intercept	0.44	0.92	0.34	0.66	0.96	0.56
Experience	0.22***	0.17***	0.21***	0.21***	0.17***	0.20***
Experience²	-0.0053***	-0.0044***	-0.0052***	-0.0053***	-0.0045***	-0.0051***
Vocational degree	0.85***	-	0.90***	0.52***	-	0.60***
Voc. degree*exp.	-0.09**	-	-0.07*	-0.06***	-	-0.05**
Voc. degree*exp.²	0.0014	-	0.0012	0.0011**	-	0.0008*
Skills	-	0.22***	0.29***	-	0.12	0.17**
Skills*exp.	-	0.02**	0.02*	-	0.03**	0.03*
Skills*exp.²	-	-0.0005**	-0.0004**	-	-0.0006**	-0.0006*
N	13	13	13	13	13	13
n	14,804	14,804	14,804	14,804	14,804	14,804
-2 Log L	1077.425	1058.873	1055.121	1044.720	1027.913	1026.746
Turning point	12.7 years	-	17.2 years	10.8 years	-	16.2 years

Figure 1: The effect of orientation and skills on employment rates. Data: PIAAC, 2012. Panel 1A represents the gross effect of educational orientation on employment, uncorrected for skills and country fixed effects, based on Model 1 from Table 2. Panel 1B represents the gross effect of skills on employment, uncorrected for type of qualification and country fixed effects, based on Model 2 from Table 2. Panel 1C represents the effect of educational orientation on employment, with controls for country and skills, based on Model 6 from Table 2. Employment rates are plotted on the left-hand scale, difference scores on the right-hand scale.

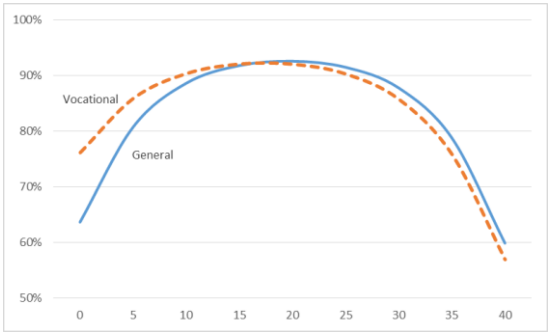
Panel 1A - gross effect of educational orientation



Panel 1B - gross effect of skills



Panel 1C - effect of vocational education with country- and skills-controls



Earnings

Table 3 reports the estimates for the ordered logit model of the effect of vocational education on the earnings decile of the respondent, with positive coefficients indicating a higher probability of being in a higher earnings decile. The results for models 1, 2 and 6 are again represented graphically in Figures 2A-2C, where we plot the probability for a respondent of being in the top half of the earnings distribution (over the full population) as a function of his potential experience.

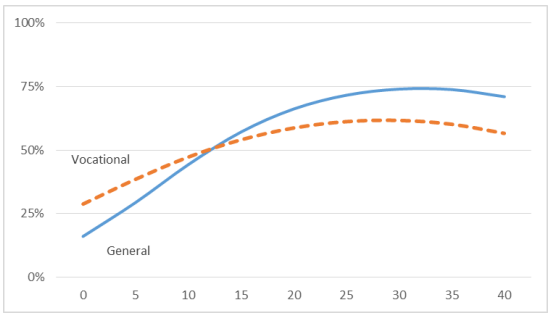
Overall, the results are to a large extent similar to the results for employment probability. First, we again observe a positive effect of vocational education at the start of the career (Model 1, Figure 2A) and the typical quadratic effect of experience, with young respondents earning less (this has often been explained by the higher productivity of more experienced workers and by an exchange between current earnings and future promotion and training opportunities). Most importantly, we again observe a difference in the life cycle earning profiles of general versus vocational graduates, with the initial benefits of vocational education disappearing about 12 years after graduation (Figure 2A). By contrast, the returns to observed skills increase continuously over the career (Figure 2B). Hence, also in monetary terms, the specific skills produced by vocational education seem to be less resistant against obsolescence than general skills. Moreover, compared with our previous results for employment probability, the initial monetary benefits of vocational (relative to general) education are somewhat smaller and are overtaken by general education a few years earlier (between 9.4 and 15.5 years depending on the specification). Similarly, for monetary earnings, controlling out skills does not affect the overall pattern (Figure 2C): even when differences in literacy and numeracy are kept under control (which, as explained above, probably leads to an overestimation of the benefits of vocational education), general education yields higher earnings (relative to vocational education) after about one decade of labour market experience.

Table 3 – Effect of having a vocational qualification on earnings decile of the respondent. Data: PIAAC, 2012. ***p<0.01, **p<0.05, *p<0.1

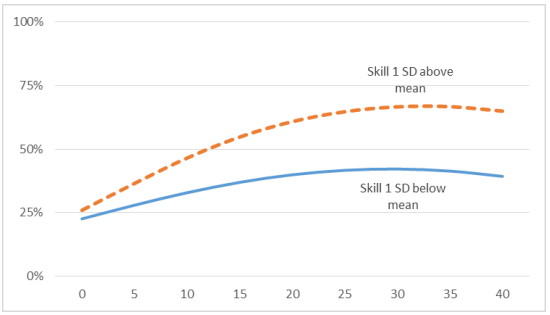
	Models without country fixed effects			Models without country fixed effects		
	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**	**Model 6**
Intercept (5th decile)	-1.65	-1.14	-1.71	-1.71	-1.19	-1.76
Experience	0.17***	0.11***	0.15	0.19***	0.11***	0.17***
Experience²	-0.0026***	-0.0016***	-0.0023***	-0.0029***	-0.0017***	-0.0025***
Vocational degree	0.74***	-	0.77***	0.76***	-	0.80***
Voc. degree*exp.	-0.07***	-	-0.06***	-0.09***	-	-0.08***
Voc. degree*exp.²	0.0009**	-	0.0009**	0.0013***	-	0.0012***
Skills	-	0.09	0.14	-	0.07	0.14*
Skills*exp.	-	0.02***	0.02***	-	0.03***	0.02***
Skills*exp.²	-	-0.0003*	-0.0002	-	-0.0004**	-0.0003*
N	13	13	13	13	13	13
n	9,253	9,253	9,253	9,253	9,253	9,253
-2 Log L	3688.092	3659.444	3653.827	3649.763	3624.115	3617.201
Turning point	12.3 years	-	15.5 years	9.4 years	-	11.9 years

Figure 2: The effect of orientation and skills on the probability to be in the top half of the earnings distribution. Data: PIAAC, 2012. Panel 2A represents the gross effect of educational orientation on earnings, uncorrected for skills and country fixed effects, based on Model 1 from Table 3. Panel 2B represents the gross effect of skills on earnings, uncorrected for type of qualification and country fixed effects, based on Model 2 from Table 3. Panel 2C represents the effect of educational orientation on earnings, with controls for country and skills, based on Model 6 from Table 3.

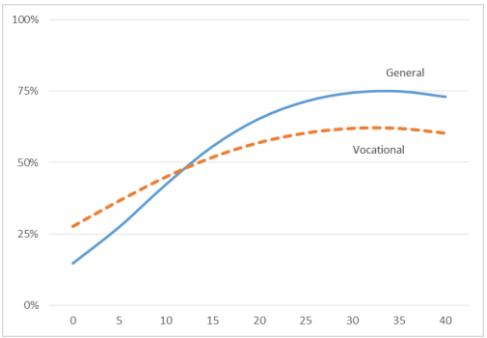
Panel 2A - gross effect of educational orientation



Panel 2B - gross effect of skills



Panel 2C - effect of vocational education with country- and skills-controls



Lifelong learning

Finally, we examine whether the depreciation of vocational qualifications can be related to differences in lifelong learning participation. In the literature, it has often been suggested that vocational education involves an under-investment in important basic skills, such as literacy, which are in turn 'foundational' for future learning. If this is true, we would expect to see this reflected in lower training rates (or training propensities) among the vocational education graduates.

Table 4 and Figure 3A-3D report estimates of the participation in and attitudes towards lifelong learning over the labour market career. Given the large cross-country differences in overall participation behaviour, which are mostly related to exogenous factors such as welfare state design (Rubenson and Desjardins (2009)), we always include country controls. Furthermore, given that most training takes place on the job, we estimate the model on the sample of respondents who have a job; the corresponding estimates for the full sample (available at the author) are similar but larger in size.

First, Models 1 to 3 reveal that at the start of the labour market career, vocational-education graduates participate in training to more or less the same degree as their general-education counterparts. However, this participation starts to diminish immediately, whereas the general-educated who keep their participation at a higher level throughout most of their labour market career (Figure 3A). Hence, over their career, vocational graduates accumulate significantly less training than general education graduates. The differences become smaller when skills are controlled for (Figure 3B); however, note again that this skill control probably induces a bias against the general educated.

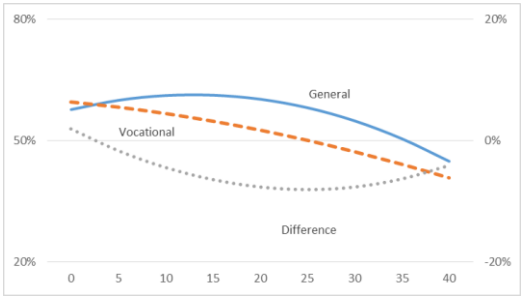
Secondly, Models 4 and 6 demonstrate that, on average, the vocational educated report less positive attitudes towards learning than the general educated. Already immediately after leaving school, the vocational educated report to be less eager to learn new things, and this difference persists over the life cycle (Figure 3C and 3D). Positive dispositions towards learning (Cornford (2002); Illeris (2003)) have often been argued to belong to the necessary foundation for successful learning in later life (Gorard (2009); Allen & Van der Velden (2012)). On top of the lower value attached to basic skills in vocational curricula, an additional explanation for the depreciation of vocational education appears to be that it succeeds less in raising one's appetite for continuous skill updating.

Table 4 – Effect of having a vocational qualification on lifelong learning participation and learning attitudes.
Data: PIAAC, 2012. ***p<0.01, **p<0.05, *p<0.1

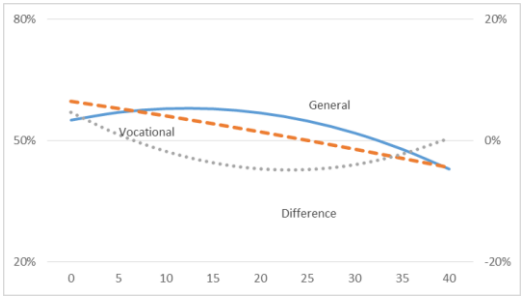
Outcome variable	Lifelong learning participation			Readiness to learn		
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	0.31	0.34	0.20	0.22	0.16	0.19
Experience	0.02	-0.01***	0.02	0.02***	0.01***	0.01***
Experience²	-0.0009***	-0.0003***	-0.0008**	-0.0005***	-0.0003***	-0.0004***
Vocational degree	0.08	.	0.19	-0.21***		-0.15*
Voc. degree*exp.	-0.03*	.	-0.03*	-0.01		-0.01
Voc. degree*exp.²	0.0007*	.	0.0007	0.0001		0.0001
Skills	.	0.25***	0.26***		0.15**	0.14**
Skills*exp.	.	0.00	0.00		0.00	0.00
Skills*exp.²	.	0.0001	0.0002		0.0001	0.0001
N	13	13	13	13	13	13
n	11,866	11,866	11,866	11,866	11,866	11,866
-2 Log L	1351.519	1340.022	1339.440	-	-	-

Figure 3: The effect of orientation and skills on lifelong learning participation and readiness to learn. Data: PIAAC, 2012. Panel 3A represents the gross effect of educational orientation on lifelong learning participation, uncorrected for skill effects, based on Model 1 from Table 4. Panel 3B represents the gross effect of skills on lifelong learning participation, with controls for skills, based on Model 3 from Table 4. Panel 3c represents the gross effect of educational orientation on readiness to learn, uncorrected for skill effects, based on Model 4 from Table 4. Panel 3B represents the gross effect of skills on readiness to learn, with controls for skills, based on Model 6 from Table 4. All models include country-fixed effects.

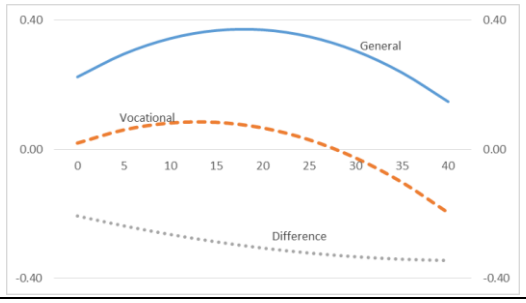
Panel 3A - gross effect of orientation on lifelong learning participation



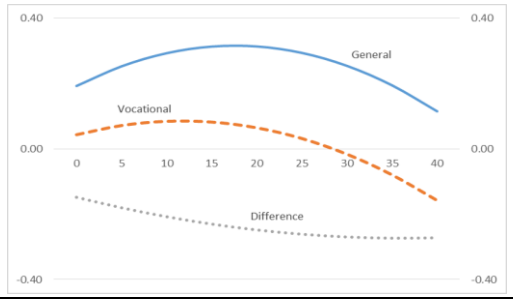
Panel 3B - effect of orientation on lifelong learning participation, controlled for skills



Panel 3C - gross effect of orientation on readiness to learn



Panel 3D - effect of orientation on readiness to learn, controlled for skills



Conclusion and future research

In this paper we used data from PIAAC to examine how vocational education is rewarded in the labour market. First, we observed that vocational education provides a strong advantage at labour market entry: it offers safe access to jobs. The advantage in terms of earnings is smaller, possibly due to the lower status of the jobs vocational education is preparing for (Müller & Shavit (1998)). However, in all specifications, the value of vocational education relative to general education strongly decreases over the labour market career. This result is consistently reproduced in various specifications, with and without controls for currently observed skills and country differences: general education graduates seem to outperform their vocational-educated counterparts in terms of employment probability and earnings from somewhere in the second decade after graduation onwards.

In the literature, this depreciation of the value of occupation-specific education has often been explained as a consequence of changing demands of the labour market, for example as a result of the introduction of new technologies. In such a context, a high level of 'foundational' skills is needed to continuously update one's skills-profile through life-long-learning. Indeed, we observe increasing relative returns to general skills over the labour market career. Moreover, the vocational educated appear to participate less in lifelong learning during most part of their careers, and they report less positive attitudes towards learning compared to their general counterparts. Hence, as Husen (1975) already posited, *'the continuous demand for new learning and relearning of specific vocational competencies would have to draw upon the resources that a good general education has laid down. In a paradoxical way, general education in our times is, due to the skills it can provide for a broad repertoire of unforeseen vocational competencies, the best vocational education an individual can obtain*.'

What does this mean for educational system design? Here, some caution seems warranted. First, while we apply a skill control to correct for differences in intake between general and vocational programmes, students in these programmes may also differ in many other regards (for example, personality, or motivation) . Our research design cannot establish counterfactually whether shifting students from vocational to general tracks might really improve their labour market careers in the longer term. Secondly, educational systems are no abstract manifestations, but are instead shaped by deep historical roots, which have led to the clustering of educational systems with welfare state and production preferences into more or less stable regimes (Estevez-Abe (2001); Peter, Edgerton & Roberts (2010); West & Nikolai (2013)).

Yet, the fact that, even from a labour market perspective, vocational education seems to lose some of its value after time, calls for further consideration. A way forward could be to analyse whether there are any

differences in the labour market patterns of vocational graduates from different vocational-oriented systems. Indeed, there is some reason to expect that the fate of vocational education graduates depends on the design of the educational system. For example, Iannelli and Raffe (2007) showed how vocational graduates from educational systems with strong employers' involvement (i.e. the dual systems in Germany and Austria) had more positive early labour market outcomes. Similarly, systems could be distinguished on the basis of the degree of integration between vocational and general tracks, as such features (e.g. tracking age) could influence the general skills of those in the vocational tracks (Hanushek & Woessmann (2006); Van de Werfhorst & Mijs (2010)). We did not consider differences between returns to vocational education across different system designs here, due to a number of obstacles impeding such a comparison: first, the demarcation of vocational education might differ between countries (in particular, the dichotomous categorization into general and vocational education neglects the existence of intermediate qualifications that do not fit well into this dichotomy, such as the technical programmes in France and Belgium), secondly, the selectivity in the intake of general and vocational programmes may differ across countries, and thirdly, the size of the national samples becomes an issue in country-specific estimations when just a (very) small share of the sample has a general secondary qualification (as in Germany and Austria). However, there is some descriptive evidence (OECD (2013)) that in particular the Scandinavian countries succeed better in providing their vocational graduates with a strong core of general skill as well as a higher readiness to learn (see Chapter 5).

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CHAPTER 5 – SYSTEMIC OBSTACLES TO LIFELONG LEARNING: THE INFLUENCE OF THE EDUCATIONAL SYSTEM DESIGN ON LEARNING ATTITUDES

Abstract

In this Chapter, I examine how the design of the school system affects the formation of attitudes towards learning and, in the longer run, participation patterns in lifelong learning. Cross-national differences in the average readiness to learn of adults, as measured in PIAAC, suggest that strong external differentiation mechanisms in secondary education, in particular tracking students at a young age and relying extensively on grade retention, lead to less positive attitudes towards learning among adults. This cross-sectional suggestion is further scrutinized by comparing learning attitudes among adults with attitudes towards reading and mathematics collected in primary school (PIRLS and TIMSS). While, overall, these diff-in-diff-analyses confirm the effects of the design of secondary education, a number of methodological issues, related to small sample sizes and differences in data definition, calls for further investigation.

Introduction

Raising participation in life-long learning (LLL) has been at the centre of the policy discourse for several decades. However, population surveys reveal that not all countries have been equally successful in raising participation rates (e.g. Boateng (2009)). Moreover, participation still remains unequally distributed among socio-economic groups, with lower educated individuals in particular participating less (Desjardins, Milana & Rubenson (2006), Robert (2012)). Overall, differences in lifelong learning participation between countries correspond rather well to the typology of welfare states developed by Esping-Andersen (1990), with countries with a social-democratic welfare state reporting high and equal participation, liberal welfare states reporting high but unequal participation, and conservative welfare states often registering lower participation. Many authors (Green (2006); Groenez and Desmedt (2008); Hefler, Ringler, Rammel & Markowitsch (2010); Riddell, Markowitsch & Weedon (2012); Rees (2013); Saar, Ure, and Desjardins (2013)) have sought to explain this correspondence between individual participation behaviour and welfare state design by pointing out that participation is not a merely individual decision, but should rather be regarded as an interplay between individual choices and a broader context that limits possible choices and makes participation less or more attractive, accessible and advantageous. As in this perspective individuals are no longer isolated 'agents' deciding whether or not to participate, but rather agents 'bounded' by the contexts in which they have to act, this general insight has been called the 'Bounded Agency' model (Boeren, Nicaise, and Baert (2010); Boeren (2011); Desjardins and Rubenson (2013)). To explain their non-participation, respondents indeed often cite external barriers, such as costs or family responsibilities, that can be addressed through social policy (e.g. public funding of training institutions and child care arrangements) (Desjardins, Milana & Rubenson (2006), Rubenson and Desjardins (2009)). Similarly, the 'variety of capitalism' (Hall & Soskice (2001)) in a country has been argued to affect participation behaviour, as the structures present in coordinated economies allow employers to pool the costs of training programs to avoid the risk of poaching (Crouch, Finegold & Sako (1999), Rees (2013)).

However, this focus on social policy to reduce external barriers might not be the full story. In particular, it should be noted that in most surveys only few respondents report to have been withheld from participation by an external barrier. Rather, the majority of non-participants state that they just 'did not want' to participate in a learning activity. For example, in PIAAC (2012) (see the Data and Method section for more information), respondents that did not participate in lifelong learning were asked whether they 'had wanted' to participate in such an activity, and if so, which external barrier prevented them from doing so. Table 1 shows that welfare state design indeed is to some extent related to the prevalence of such external barriers, with particularly respondents from the Mediterranean countries, where welfare states are weaker, reporting such barriers (Arts and Gelissen (2002)). However, even in these countries

these reasons only apply to a minority of the non-participants, while a much larger share reported not wanting to participate at all.

Table 1 - Share (%) of the respondents who, during the preceding year, participated in lifelong learning, did not want to participate, resp. wanted to participate but were prevented by an external barrier. Data: PIAAC (2012), age 25-65. Countries are sorted by the proportion of the group who wanted to participate but were prevented by an external barrier.

	Full sample			Low-educated respondents		
		Did not participate			Did not participate	
	Participated	Did not want to participate	Wanted to participate, but was prevented by external barrier	Participated	Did not want to participate	Wanted to participate, but was prevented by external barrier
IE	49.8	39.5	10.8	27.6	60.4	12.1
ES	46.8	42.8	10.5	27.6	60.0	12.4
FR	36.8	55.0	8.2	17.4	74.0	8.6
IT	24.6	68.0	7.4	11.2	81.9	7.0
DK	66.1	26.8	7.1	42.3	48.4	9.3
DE	54.7	38.7	6.6	22.5	69.0	8.6
SE	66.4	27.2	6.5	42.2	48.5	9.3
AT	48.7	44.9	6.4	24.7	68.4	7.0
UK	55.4	38.5	6.1	32.7	58.7	8.5
FI	65.3	29.1	5.6	31.0	61.6	7.4
NO	62.7	32.0	5.3	37.9	55.3	6.9
FL	48.7	46.6	4.8	19.6	73.3	7.1
NL	64.3	31.1	4.7	40.4	54.2	5.3

This observation seems to suggest that the focus on external barriers and welfare state design to understand non-participation should be complemented by considering which 'internal' barriers might prevent respondents from *wanting* to participate, and what factors might explain cross-country differences in this regard. Moreover, note that not wanting to participate was prevalent in particular among low-educated respondents (i.e. those with no secondary education qualification), also making this issue relevant for understanding inequalities in participation. Unfortunately, however, Table 1 does not yet allow to draw straightforward conclusions on this point, due to concerns about the data quality. First, what do respondents exactly mean when they state that they did not 'want' to participate? Already in her seminal work on barriers towards learning, Cross (1981) expressed caution when interpreting standardized survey answers, arguing that these often conceal underlying barriers[19]. Secondly, Desjardins,

[19] It is interesting to compare the results from PIAAC with those from the Adult Education Survey (2011) (cf. Boeren (2014)). In contrast to PIAAC, where not wanting to participate was accepted as a sufficient explanation for not participating, in the AES respondents in this case were asked again if any external barrier (such as costs or family responsibilities) then made them not wanting to participate. Indeed, a majority among those not wanting to participate reported such an underlying barrier ([Author]). Unfortunately, the AES is of

Milana & Rubenson (2006) argued that social desirability often leads to underreporting internal barriers, shifting the blame to external barriers. As it is not unlikely that cultures differ in this regard, this could bias international comparisons.

Hence, in this article, we will approach this role of internal dispositions in understanding lifelong learning behaviour by considering more direct measures of attitudes towards learning, based on self-reported assessments from different surveys.

Background

Barriers to lifelong learning

Research on barriers to lifelong learning participation have often adopted the typology developed by Cross (1981), distinguishing between three kinds of barriers: situational barriers that arise from one's situation in life (such as family responsibilities), dispositional barriers (such as not being convinced of the value of participation), and institutional barriers (such as high enrolment fees). However, defining a separate category of institutional barriers is somewhat artificial, as one could argue that indeed *all* barriers are to some extent influenced by institutional arrangements: for example, when family responsibilities are considered a barrier, this is not only related to the situation of being a parent, but also to institutional arrangements about child care. Hence, in this article, we will largely rely on the framework developed by Boeren, Nicaise, and Baert (2010) and reduce Cross' typology to its two main dimensions, which we will call external and internal barriers. First, external barriers arise when the 'costs' of lifelong learning are expected to exceed its 'benefits'. According to human capital theory (Becker (1962)), decisions about lifelong learning are the result of a cost-benefit analysis (Breen and Goldthorpe (1997): individuals will invest in learning activities if and only if these are expected to generate returns that are higher than the initial investment cost. The costs should be understood here in a broad sense (both direct costs such as enrolment fees and indirect costs such as opportunity costs), while the benefits may include better labour market career perspectives, but also an enlarged social network. However, even when the benefits outweigh the costs, people may not be willing to participate because of certain internal barriers towards participation. Psychological dispositions about learning have indeed been shown to be important determinants of participation behaviour (Keller (1987); McCombs (1991)). For example, Desjardins, Milana & Rubenson (2006) report how confidence in one's ability to learn is an important predictor of

relatively little further use here due to severe differences between countries in the way the relevant variables were collected ([Author]).

participation in lifelong learning. In the literature, the mental background which influences the capacity of the individual to successfully participate in learning has been given many labels, such as 'attitudes towards learning', 'learning dispositions', 'learning intentions', or 'readiness to learn', with several scholars trying to identify their key constituents, such as dedication, enjoyment, self-efficacy, and cooperation (McKenna (1994); Guthrie, Schafer, Von Secker, and Alban (2000); Carr and Claxton (2002); Crick and Yu (2008)).

Both external and internal barriers may explain why participation rates are usually lower among those with a lower educational attainment. First, the evaluation of the costs and benefits associated with lifelong learning depends on socio-economic background: the lower educated often earn less and thus may be more sensitive about cost issues, while the skills-beget-skills hypothesis (Cunha and Heckman (2007)) postulates that learning will be less efficient for those with lower levels of skills. Moreover, the return to participation will usually be lower in more routine jobs (Nicaise and Bollens (1998)). Secondly, low educated individuals are more likely to be confronted with psychological barriers, as low educational attainment is often the result of a less successful 'educational life course' (Lamb, Markussen, Teese, Sandberg & Polesel (2010)). Negative school experiences could thus damage self-confidence as a learner (Christenson, Reschly & Wylie (2012)) and accumulate into a distorted learner identity (Gorard and Smith (2004); Illeris (2003)), preventing further learning activities (Beder (1990); Crossan, Field, Gallacher, and Merrill (2003); Ellsworth (1991); Hayes (1988)).

Over the last decades, lifelong learning policies in Europe have tried to reduce both external and internal barriers towards lifelong learning, in particular among the disadvantaged. For example, Eurydice (2015) describes how many countries have developed financial support mechanisms (such as subsidies to employers and vouchers) to tackle costs issues. Similarly, the introduction of flexible pathways, such as modular programmes, aim to overcome dispositional barriers by rewarding small program units more swiftly. However, this of course can only compensate for negative views already existing among the low-educated. If prevention is better than cure, it would be interesting to consider whether educational policy can ameliorate the formation of learning attitudes among students, and in particular among weaker students. Indeed, attitudes towards learning, as part of the so-called '21st century skills' (Allen & Van der Velden (2012)) are receiving increasing attention. As the OECD (2012) put it: '*The need for deep and wide knowledge means that education systems will have to give students a forma mentis, or mind-set, that is open to absorbing and filtering new information and is able to combine that information with acquired knowledge in innovative ways. More than ever, education systems need to help students learn how to learn: only if students have the capacity, motivation and enthusiasm to be lifelong learners will they be able to remain active and productive citizens throughout their lives.*' Similarly, Carr and Claxton (2002), Claxton (2009) and Levin (2012) all have stressed that the efficiency of an educational system should not be evaluated in terms of cognitive proficiency development alone, but that this evaluation should also

include psychological dispositions. On the meso-scale, a number of instructional practices and school-level programmes assumed to lead to a higher learning engagement have been identified (Guthrie, Schafer, Von Secker, and Alban (2000), Barnett and Irwin (1994), Brozo, Shiel, and Topping (2007); Dungworth, Grimshaw, Mcknight, and Morris (2004)). However, research has previously shown that the institutional design of the education system as a whole affects a large array of educational outcomes, such as skill levels (Van de Werfhorst and Mijs (2010)), labour market transition (Müller and Shavit (1998)) and citizenship values (Van de Werfhorst (2015)). Hence, in this article, we will address the question whether macro-level educational system characteristics could also affect the development of attitudes towards learning.

Educational system design and attitudes towards learning

In their article, Dupriez, Dumay, and Vause (2008) have distinguished four types of educational systems. First, in 'early tracking' countries pupils with different abilities are streamed already at young ages (10-14 years) in distinct educational trajectories, often located in different schools, each leading to a specific occupational endpoint. Secondly, in 'ability grouping' countries, students also take courses on different levels, but grouping is here flexible and discipline dependent. In the third group of 'uniform integration' countries no formal differentiation is applied in the lower secondary cycle (until age 14/15), but struggling students are separated from their stronger peers through a massive use of grade retention[20]. Finally, in the 'individual integration' countries classes can be considered truly heterogeneous: individual measures, such as differentiated teaching and temporary remediation classes, are implemented to allow all students to master a similar common core curriculum throughout lower secondary.

This design of the educational system can indeed be expected to affect the school experiences of students. For example, in an individual integration system, a student at risk of underperformance will temporarily undergo intensive remediation before returning to his regular class. However, in the other systems, a similar student would be placed in a separate lower track school, be assigned to a less ambitious ability group track, or repeat a grade, respectively. First, the mere fact of being treated differently may influence the self-confidence and perceptions of this student: why does this happen to me? Secondly, the treatment determines the kind of peers (class- and schoolmates) with whom the student can compare himself. Finally, the treatment may limit the learning perspectives of students: for example, in an early tracking system, the most prestigious educational routes are already blocked at an

[20] In early tracking countries grade retention is often massively used as well. The 'uniform integration' category only contains countries that combine a massive reliance on grade retention with a formally undifferentiated lower cycle.

early age. In the following paragraph, we will review some literature findings on how all three external differentiation mechanisms (tracking, ability grouping, and grade retention) may impact on the formation of psychological dispositions about learning, taking the externally undifferentiated individual integration system as the reference type.

Early tracking

In the literature, the effect of early tracking on the development of learning attitudes has often been related to the school and class climate in which pupils mature (Van Houtte and Stevens (2009)). Attitudes towards school have usually been shown to be less advantageous in lower tracks, which are often regarded as a second choice for those who do not meet the standards set for the higher track (Ainsworth and Roscigno (2005)). This may result in feelings of failure and frustration, demotivating students who do not feel they are being given equal opportunities to success (Miller (1980)). Moreover, lower track students may evaluate schooling as less relevant because it seems less beneficial for their future. For example, students in lower tracks have been reported to see their school involvement as having little future payoff and to be more fatalistic about their future (Malmberg and Trempala (1997); Friedkin and Thomas (1997); Catsambis, Mulkey, and Crain (1999)). Accordingly, the study culture in lower tracks is often less oriented towards learning (Brookover, Schweitzer, Schneider, Beady, Flood, and Wisenbaker (1978), Van Houtte and Stevens (2010)). The differentiation / polarization theory (Hargreaves (1967); Lacey (1971)) then postulates that the more tracks are institutionally differentiated from each other, the more negative attitudes are concentrated in low track schools, and the more these might accumulate into a profound anti-school culture (Abraham (1989); Berends (1995); Ball (1981)).

On the other hand, however, it has been argued that the academic self-concept of weaker students might benefit from early tracking. Indeed, the 'Big-Fish-Little-Pond' effect suggests that self-concept depends on the ability of class and school peers: the higher the ability of these peers, the less confident a student will be on his own ability (Marsh and Hau (2003); Thijs, Verkuyten, and Helmond (2010); Marsh and Parker (1984); Catsambis, Mulkey, and Crain (2001); Wouters, Colpin, Germeijs, and Verschueren (2009); Wouters, De Fraine, Colpin, Van Damme, and Verschueren (2012)). Hence, low achieving students could also benefit from early tracking as this reduces the exposure to more able peers. However, an opposite 'assimilation' effect has also been put forward, arguing that being a member of a group of low-achieving students negatively reflects on the self-concept of each individual student.

Ability grouping

To some extent, ability grouping may look similar to tracking. However, selection into ability groups is usually more flexible than tracking: students can always be re-allocated to higher or lower ability group over the school careers, and students can be in different ability groups for different disciplines. As a consequence of this flexibility, being assigned to a lower group might cause less stigma than rigid tracking (Tieso (2003)). The other way round, the effect on the academic self-concept might be less strong, as the reference groups with which students compare themselves is less fixed and schools are not restricted to just one track (Chmielewski, Dumont, and Trautwein (2013)). Hence, ability grouping is expected to have less pronounced effects on attitude development than early tracking.

Grade retention

Finally, it has been argued that pupils might perceive grade retention as a punishment, which impacts negatively on their attitude towards school. Indeed, grade repeaters often report that their retention caused a stigma, raising the risk of being excluded by their new classmates (Byrnes (1989); Roderick (1994). On one hand, grade repeaters start with an advantage in knowledge and skills over their new classmates, which may enable them to experience some initial successes and increase their academic self-concept. However, this advantage will last only temporarily, as the peer groups closes the gap during the school year after retention.

Numerous studies have tried to pin down the net effect of grade retention on learning dispositions. Meta-analyses by Holmes and Matthews (1984) (overviewing studies published between 1929 and 1981) and Jimerson (2001) (adding studies published between 1981 and 1999) have concluded that, on average, retained students report slightly less favourable attitudes towards school than a comparable reference group of promoted students. However, a large majority of the individual studies did not come to any significant effect. More recent studies confirm this ambiguity: while Hong and Yu (2008) and Wu, West, and Hughes (2010) suggest that retained children report higher levels of engagement and self-confidence, Goos, Van Damme, Onghena, Petry, and de Bilde (2013) instead report negative psychological effects of grade retention and Lamote, Speybroeck, Van Den Noortgate, and Van Damme (2013) come to a neutral appreciation. An explanation for the ambiguity between studies may be the way endogeneity was accommodated for. Grade retention can be both seen as a cause and a consequence of negative attitudes towards schooling, leading to a circular relationship between attitudes to learning, school performance and grade retention (Fredricks, Blumenfeld, and Paris (2004); Nurmi, Aunola, Salmela-Aro, and Lindroos (2003); Baumert, Nagy, and Lehmann (2012); Stanovich (1986)). This issue has usually been resolved by

creating some kind of match between retained students with promoted students on the basis of a selected number of relevant characteristics, such as ability, previous academic achievement, socio-economic status, and/or gender. However, studies differ in the quality of their research design, and Allen, Chen, Willson, and Hughes (2009) suggest that the better the design, the less negative the observed effects of grade retention.

Existing comparative research

The research cited in the previous paragraph usually relied on student-level data from a single country. In this article, we will instead adopt a macro-level approach and relate country-average attitudes towards learning with the macro-level set-up of the educational system. A disadvantage of this approach is that we cannot directly observe the effect of individual experiences – we only observe their aggregated impact. On the other hand, country averages are less sensitive to endogeneity biases that might distort individual observations.

To date, only a few attempts to link attitudes towards learning with educational system design have been performed within a comparative perspective. First, using PISA-data, Dupriez, Dumay, and Vause (2008) suggested that, while external differentiation negatively affects the academic performance of weaker students, it positively affects their academic self-concept, arguing that this '*raises the question of the psychological cost of mixed grouping and calls for further investigation*.' By contrast, the analysis by Borgonovi (2014) on a more recent PISA-wave observed *'a strong negative association between the levels of students' motivation and the degree to which school systems sort and group students into different schools and/or programmes'*. In this article, we will try to further investigate these (conflicting) findings, in particular by using data collected among adults instead of data from 15-year-old pupils still at school.

Data and method

To better understand the effect of the educational system on dispositional barriers towards learning we will explore data from the Programme for the international Assessment of Adult Competencies (PIAAC), a skill survey conducted by the OECD in 2011-2012. In PIAAC, respondents had to express their appreciation of six statements relating to learning attitudes on 5-point Likert scales (Table 2). The answers to these six questions were then aggregated into a 'readiness to learn'-index, with higher values corresponding to a higher readiness to learn. In this article, we will make use of this aggregated index, which arguably gives the most complete overview of attitudes towards learning. In addition, we will focus on those who disagree with the statement '*I like learning new things*', as such an aversion towards learning might be an indication of a strong dispositional barrier. Moreover, learning enjoyment has been argued to constitute the most straightforward component of learning attitudes (Sainsbury and Schagen (2004)), and this simple formulation will allow us to make more reliable comparisons (Twist, Gnaldi, Schagen, and Morrison (2004)) with similar self-reported appreciations collected among 10 year olds (see below). In order to increase international comparability, we will limit ourselves to the 13 Western-European countries that participated in PIAAC and delete respondents born outside the country of survey. Moreover, in this first step, we will focus on attitudes among adults (25-65 years olds).

Table 2 - Statements on attitudes towards learning, as surveyed in PIAAC, PIRLS and TIMSS. Possible appreciations in PIAAC were to agree 'not at all', 'very little', 'to some extent', 'to a high extent', and 'to a very high extent'. Possible appreciations in PIRLS and TIMSS were to 'disagree a lot', 'disagree a little', 'agree a little', and 'agree a lot'. Possible appreciations in TIMSS for reading frequency where 'never', 'less than 1 hours', '1-2 hours', '2-4 hours', 'more than 4 hours'.

PIAAC	PIRLS	TIMSS	Variables used in aggregated attitudes indices	Variables used for identifying those not liking to learn
I like learning new things.	I enjoy reading.	I enjoy learning mathematics.	X	X
When I hear or read about new ideas, I try to relate them to real life situations to which they might apply.	I like talking about books with other people.	Mathematics is boring (reverse coded) (only in 2007).	X	-
When I come across something new, I try to relate it to what I already know.	I would be happy if someone gave me a book as a present.	I like mathematics (only in 2007).	X	-
I like to get to the bottom of difficult things.	I think reading is boring (reverse coded).		X	-
I like to figure out how different ideas fit together.	I read only if I have to (reverse coded).		X	-
If I don't understand something, I look for additional information to make it clearer.			X	-
		On a normal school day, how much time do you spend reading a book for enjoyment?	-	X (alternative)

The relationship between the country-averages of these attitudes and the design of the initial education system will be first illustrated by considering the correspondence with the typology of education systems proposed by Dupriez, Dumay, and Vause (2008). Next, a multivariate model will be used to express country-average attitudes as a function of three quantative characteristics of the educational system (Table 3). First, the extent of tracking will be quantified using the Index of Tracking developed by Bol and Van de Werfhorst (2013), which incorporates, through factor analysis, the age of first selection, the percentage of the curriculum that takes place in a differentiated setting, and the number of school types available to 15-year old students. Secondly, grade retention usage will be quantified as the percentage of students that have already repeated at least one grade by age 15, which was taken from PISA 2009. Finally, we will use a dummy indication for the system-wide use of ability grouping, which primarily serves to distinguish the Anglo-Saxon countries.

Table 3 – Selected educational system characteristics. Note: FL refers to the Flemish region; the other Belgian regions did not participate in PIAAC.

Country	System typology (Dupriez, Dumay, and Vause (2008))	Tracking index (Bol and Van de Werfhorst (2013)	Share of students having repeated at least one grade by age 15 (%, PISA 2009)	System-wide use of ability grouping (dummy)
FL	Early tracking	+1.04	24.9	0
NL	Early tracking	+0.97	26.7	0
DE	Early tracking	+1.79	21.4	0
AT	Early tracking	+1.75	12.6	0
FR	Uniform integration	-0.48	36.9	0
IT	Uniform integration	+0.18	16.0	0
ES	Uniform integration	-0.80	35.3	0
IE	Ability grouping	-0.13	12.0	1
UK	Ability grouping	-1.08	2.2	1
NO	Individual integration	-1.08	0.0	0
SE	Individual integration	-1.06	4.6	0
DK	Individual integration	-0.93	4.4	0
FI	Individual integration	-0.93	2.8	0

However, this empirical strategy has one important shortcoming. Cross-sectional cross-country studies always suffer from the risk of unobserved confounder bias: countries have many different features that may influence the observed outcomes, and a failure to take these into account may bias the observed effects of a single educational system characteristic. In particular, the validity of self-reported attitudes may be affected by cultural inequivalence, e.g. in response behaviour or questionnaire wording (Pena (2007)). While we have tried to minimize this bias by using only data from relatively comparable Western

European countries, in a second step we will further scrutinize the robustness of our findings by using a diff-in-diff technique. This approach combines data from two cross-sectional measurements, one performed before and one performed after transfer into the secondary education system, to assess how secondary education has influenced the development of attitudes. This approach is assumed to remove bias due to confounders from outside the secondary education system, as these would affect both measurement points[21]. In particular, we will compare country-average attitudes towards learning measured in PIAAC with country-average attitudes towards learning collected in primary education. For the latter, we will use two waves (2001 and 2006) of the Progress in International Reading Literacy Study (PIRLS), conducted by the International Association for the Evaluation of Educational Achievement (IEA) on reading achievement in 4th grade, and two waves (2003 and 2007) of the Trends in International Mathematics and Science Study (TIMSS), also conducted by the IEA in 4th grade. In PIRLS, attitudes towards reading were collected in terms of the appreciation (on a 4-level Likert scale) of five statements (Table 2). We will again use the aggregated index to have a complete overview and additionally consider respondents who disagreed with the statement '*I enjoy reading*', which are arguably the most vulnerable for developing dispositional barriers towards further learning. In TIMSS, attitudes towards mathematics were collected in terms of the appreciation with up to three statements (Table 2). We will again use the aggregated index and the extent of disagreement with the statement '*I enjoy learning mathematics*'. As an alternative, we will use the share of respondents who reported to 'never' read a book for enjoyment at home, as this can be thought of as less strictly related to school and thus more indicative of learning attitudes later in life. As, depending on the wave, respondents in the primary education assessments were born somewhere between 1990 and 1997, these attitudes will be compared with those from PIAAC-respondents born between 1987 and 1997 (PIAAC only reports 5-year age bands). Table 4 reports all resulting sample sizes. To increase comparability across surveys, we will standardize all variables.

[21] See Hanushek and Woessmann (2006) for a similar empirical approach, where it was used to investigate the effect of secondary educational system design on skill gaps between weak and strong students. See also Chapter 2.

Table 4 - Sample sizes for the cross-sectional analysis in PIAAC and the diff-in-diff-analyses with PIRLS and TIMSS

	Cross-sectional	Diff-in-diff model PIRLS-PIAAC		Diff-in-diff model TIMSS-PIAAC	
Country	**PIAAC (25-65)**	**PIAAC (15-25)**	**PIRLS**	**PIAAC (15-25)**	**TIMSS**
AT	3,523	818	4,774	818	4,070
DE	3,747	975	13,083	975	4,758
DK	4,899	871	3,783	871	3,181
EN	6,733	1,121	6,379	1,121	6,758
ES	4,306	880	3,721	-	-
FI	4,363	-	-	-	-
FL	3,714	922	4,257	922	4,395
FR	5,053	1,052	7,423	-	-
IE	4,166	-	-	-	-
IT	3,676	841	6,733	841	8,377
NL	3,779	892	7,752	892	5,542
NO	3,417	1,173	6,734	1,173	7,860
SE	2,975	742	9,344	742	4,171
n	54,351	10,287	73,983	8,355	49,112
N	13	11	11	9	9

Finally, the literature review suggests that the effects of educational system characteristics may differ across the educational spectrum. We will first investigate possible differential effects by estimating a micro-level model in which an individual's attitudes[22] are predicted on the basis of his skills (country-level standardized) and interact these with the educational system design of his country. Secondly, we will again scrutinize these models by matching respondents from PIAAC with respondents from PIRLS on the basis of their country, gender, and ranking in the literacy skill distribution (percentile in each country) (Seawright (2009)): for example, a German female PIAAC-respondent in the 80th literacy percentile will be matched with a German female 10 years old in the 80th percentile in PIRLS. This results in a dataset consisting of 2.200 matched cells[23] (11 countries * 2 sexes * 100 percentiles). We will then assess whether the effect of educational system characteristics on adult attitudes towards learning depend on the proficiency of the respondent, controlling for attitudes recorded among a similar respondent in the primary education assessment.

[22] Since the readiness to learn index only can have a limited number of levels, these will be estimated with an ordered logit model. The probability of expressing aversion towards learning will be estimated with a logistic model.

[23] When more than one respondent occupies a cell, we average out their aggregate attitudes.

Results

Basic cross-sectional observations

We start by verifying the relationship between the observed attitudes on learning and individual lifelong learning behaviour in PIAAC. Table 5 shows that, controlling for differences in education, sex and age, attitudes towards learning have a significant effect on lifelong learning participation. Moreover, the interaction term suggests that in particular among those with a low educational attainment, negative dispositions could act as a barrier to participation in learning activities.

Table 5 - Effect of readiness to learn on participation in lifelong learning. Data: PIAAC, age 25-65. Standardized coefficients. Country fixed effects (not shown). ***: p<0.01, **: p<0.05, *: p<0.10

	Model 1	Model 2
Intercept	0.17	0.18
Age	-0.35***	-0.35***
Sex	-0.06***	-0.06***
Educational level	0.65***	0.65***
Readiness to learn	0.25***	0.25***
Educational level *readiness to learn		-0.05***
N	13	13
n	54,351	54,351
-2 log L	199.194.017	199.126.665

Table 6 presents the average aggregate index on learning attitudes (readiness to learn) as measured in the different countries in the sample, sorted from high to low. The table also includes the Wald 95% confidence limits for the country effects from a model predicting readiness to learn controlling out the effect of individual characteristics[24], showing that, overall, the observed differences between countries are statistically significant. Moreover, the share of respondents reporting not to like learning is reported. Overall, the observed ranking reflects the educational systems typology developed by Dupriez, Dumay, and Vause (2008) well: the individual integration systems seem to be most successful in promoting positive attitudes towards learning, followed by the uniform integration and ability grouping countries (which are mutually statistically undistinguishable), while the four early tracking countries report the lowest readiness to learn.

[24] In particular, younger and male respondents report a higher readiness to learn. Although it has a strong effect on readiness to learn, education level is not included since this the average educational level cannot be considered exogenous to the educational system.

Table 6 - Attitudes towards learning among different educational systems. Data: PIAAC (2012), age 25-65. Countries are sorted according to the average readiness to learn.

Country	Average readiness to learn	95%-confidence intervals for country effects on readiness to learn			Share reporting not liking to learn (%)	Educational system type
		Lower bound	Standardized estimate	Upper bound		
FI	2.36	0.27	0.33	0.39	2.71	Individualized integration
DK	2.28	0.18	0.24	0.30	1.80	Individualized integration
SE	2.20	0.10	0.15	0.20	1.71	Individualized integration
ES	2.16	0.08	0.11	0.13	4.17	Uniform integration
NO	2.15	0.02	0.09	0.16	2.08	Individualized integration
IT	2.08	0.01	0.03	0.05	6.17	Uniform integration
FR	2.08	-0.01	0.01	0.04	3.63	Uniform integration
IE	2.06	-0.09	-0.01	0.06	4.63	Ability grouping
UK	2.06	-0.03	-0.02	0.00	5.84	Ability grouping
AT	1.96	-0.16	-0.11	-0.05	6.93	Early tracking
DE	1.90	-0.19	-0.17	-0.15	5.30	Early tracking
NL	1.74	-0.38	-0.34	-0.30	7.25	Early tracking
FL	1.74	-0.40	-0.34	-0.28	9.47	Early tracking

Table 7 presents the results from a multivariate model explaining country-average attitudes to learning as a function of tracking index, grade retention use, and ability grouping (because of the sample size, we do not include more than two predictors at the same time). The results suggest that early tracking in particular is associated with less positive attitudes towards learning among adults: in all specifications, the estimates are highly significant. Secondly, a widespread use of grade retention seems associated with a lower readiness to learn, although the effect is reduced when the correlation between early tracking and grade retention use is controlled for.

Table 7 - Standardized estimates from a multivariate regression model explaining country-average attitudes towards learning as a function of selected secondary education system characteristics. Data: PIAAC (2012), 25-65 year olds. ***p < 0.01, **p < 0.05, *p< 0.1

	Dependent variable: aggregate index of attitudes towards learning				Dependent variable: share not enjoying learning			
Tracking index	-0.78***		-0.70***	-0.82***	0.74***		0.67**	0.80***
Grade retention rate		-0.49*	-0.22			0.42	0.16	
Ability grouping				-0.17				0.27
Adj. R^2	0.58	0.17	0.58	0.57	0.50	0.11	0.48	0.54
N	13	13	13	13	13	13	13	13

Accounting for early attitudes

We will now scrutinize our cross-sectional findings by taking into account information on attitudes towards school measured in primary education. Table 8 presents the results from a multivariate model predicting country-average attitudes to learning among an age cohort (15-25) as a function of attitudes towards school previously observed among the same age cohort in primary education, the tracking index, and grade retention use in secondary education (as we have only one ability grouping country left in this sample, we cannot investigate its effect; moreover, due to the smaller numbers of countries, we only investigate one educational system characteristic at the time).

First, the results show that country-average attitudes among adults are consistently related to country-average attitudes recorded in primary education. Hence, part of the differences between countries observed above seem to have their origin in factors outside the secondary educational system. However, even after controlling out early differences, the design of secondary education still has its own effect on learning attitudes. In particular, early tracking is consistently associated with a lower readiness to learn and a larger share of respondents indicating not to like learning, although the strength of the effect varies depending on the precise specification. Similarly, the intensive use of grade retention in secondary education leads to less positive feelings about learning and, in particular, a larger share of respondents reporting not to learn at all.

Table 8 - Standardized estimates from a multivariate regression model explaining country-average attitudes towards learning among 15-25 years olds (PIAAC) as a function of country-average attitudes among 10 years olds (PIRLS/TIMSS) and selected secondary education system characteristics. Data: PIAAC (2012), PIRLS (2001 & 2006), TIMSS (2003 & 2007). ***p < 0.01, **p < 0.05, *p< 0.1

Primary education: PIRLS	**Dependent variable: aggregated attitude**			**Dependent variable: share not enjoying learning**		
Corresponding attitude in primary education	0.37	0.77*	0.69**	0.37	0.70***	0.66***
Tracking index	-0.68**		-0.61**	0.37		0.19
Grade retention rate		-0.64	-0.48		0.87***	0.83***
Adj. R^2	0.48	0.19	0.58	0.13	0.81	0.83
N	11	11	11	11	11	11
Primary education: TIMSS	**Dependent variable: aggregated attitude**		**Dependent variable: share not enjoying learning**			
			'Not enjoying maths' as measure for primary education		**'Never reading at home for enjoyment' as measure for primary education**	
Corresponding attitude in primary education	0.25	0.64	0.38	0.47	0.71***	0.68**
Tracking index	-0.70*		0.28		0.59**	
Grade retention rate		-0.75*		0.34		0.46*
Adj. R^2	0.37	0.26	0.12	0.19	0.69	0.64
N	8	8	9	9	9	9

Differential effects across the educational spectrum

Finally, we consider whether the design of the educational system has different effects across the educational achievement spectrum. Indeed, cross-national differences in the average readiness to learn and in the share reporting not to like learning are largest among the low-educated respondents (Table 9).

Table 9 - Attitudes towards learning across the educational spectrum. Data: PIAAC (2012), age 25-65. Countries are sorted according to the average readiness to learn among the low educated.

	Average readiness to learn			Share reporting not liking to learn			Educational system type
	Low educated	Middle educated	High educated	Low educated	Middle educated	High educated	
FI	2.06	2.31	2.50	8.9%	2.7%	0.7%	Individualized integration
SE	1.94	2.14	2.43	3.9%	1.6%	0.6%	Individualized integration
NO	1.94	2.08	2.32	5.0%	1.8%	0.8%	Individualized integration
DK	1.91	2.21	2.52	5.7%	1.5%	0.3%	Individualized integration
ES	1.91	2.20	2.51	7.3%	2.2%	1.0%	Uniform integration
IT	1.81	2.26	2.69	9.4%	3.5%	0.7%	Uniform integration
FR	1.78	2.06	2.34	9.4%	2.5%	0.8%	Uniform integration
IE	1.77	2.05	2.36	10.7%	2.9%	0.7%	Ability grouping
UK	1.63	2.03	2.39	13.4%	4.4%	2.1%	Ability grouping
AT	1.62	1.94	2.35	15.8%	6.1%	1.5%	Early tracking
DE	1.55	1.81	2.13	17.4%	5.9%	1.7%	Early tracking
NL	1.33	1.70	2.10	16.8%	5.5%	1.7%	Early tracking
FL	1.29	1.62	2.05	22.8%	10.8%	2.2%	Early tracking

Table 10 reports the results from a *micro-level model explaining individual attitudes* towards learning as a function of individual characteristics (including measured literacy skills), educational system characteristics, and their interaction. Overall, the estimated interaction effects point in the expected direction, confirming that the effects of the external differentiation mechanisms vary according to the skill level of the respondent, and in particular that tracking, grade retention and ability grouping have their most negative effects among respondents with low literacy skills. However, note that the interaction effects are usually much smaller than the main effects: as all variables were standardized, this means that the mechanisms would deteriorate learning attitudes even at the high end of the skill spectrum. For example, in the first model, the effect of tracking on the attitudes of a respondent scoring two standard deviations above the country-average literacy level would still be negative (-0.29+2*0.06 = -0.17). We will come back to this in the discussion section.

Finally, in Table 11 the learning attitudes of adults are controlled for attitudes recorded among matching respondents from primary education on the basis of their country, gender, and skill level. While these early attitudes are strongly associated with the matched adult attitudes, this does not alter the general observation regarding the effect of the educational system characteristics, with less positive attitudes towards learning and a higher risk of not liking to learn at all in countries with early tracking and a widespread reliance on grade retention. However, the control seems to further reduce any interaction effects: apart from the effect of grade retention on the probability not to like learning, which is strongest

among those with the lowest skills, the interactions do not have the expected signs (although they are far from significant).

Table 10 - Standardized estimates from a micro-level model explaining individual attitudes towards learning (PIAAC) as a function of individual characteristics and selected secondary education system characteristics. Data: PIAAC (2012), age 25-65. Aggregated attitudes are estimated using an ordered logit model, enjoyment using a logistic model. Standard errors clustered by country. ***p < 0.01, **p < 0.05, *p< 0.1

	Dependent variable: aggregated attitude				**Dependent variable: not enjoying learning**			
Individual characteristics								
Age	-0.20***	-0.20***	-0.20***	-0.20***	0.55***	0.55***	0.57***	0.55***
Gender (ref: female)	0.05**	0.05**	0.05**	0.05**	-0.05*	-0.05*	-0.05*	-0.05*
Skill proficiency	0.47***	0.47***	0.47***	0.47***	-0.77***	-0.77***	-0.77***	-0.77***
Educational system characteristics								
Tracking index	-0.29***		-0.29***	-0.32***	0.36***		0.35***	0.42***
Tracking index*proficiency	0.06***		0.06***	0.06***	0.01		0.02	0.02
Grade retention rate		-0.09	-0.03			0.13	0.08	
Grade retention rate*proficiency		0.02	0.01			-0.03***	-0.03**	
Ability grouping				-0.12**				0.22*
Ability grouping*proficiency				0.04*				-0.01
-2 Log L	2762.098	2787.487	2761.878	2758.461	358.793	364.107	358.366	357.078
n	54,351	54,351	54,351	54,351	54,351	54,351	54,351	54,351
N	13	13	13	13	13	13	13	13

Table 11 - Standardized estimates from a micro-level model explaining individual attitudes towards learning of 15-25 years olds (PIAAC) as a function of attitudes among matched 10 years olds (PIRLS) and selected secondary education system characteristics. Data: Matched dataset using PIAAC (2012) and PIRLS (2006). Standard errors clustered by country. ***p < 0.01, **p < 0.05, *p< 0.1

Primary education measurement point: PIRLS	**Dependent variable: aggregated attitude**			**Dependent variable: not enjoying learning**		
Individual characteristics						
Attitude in primary education	0.10	0.15*	0.14**	0.20**	0.24***	0.24***
Gender (ref: female)	0.05	0.07	0.07	-0.04	-0.05	-0.05
Skill proficiency	0.52***	0.48***	0.50***	-0.82***	-0.77***	-0.77***
Educational system characteristics						
Tracking index	-0.36***		-0.34***	0.15		0.14
Tracking index*proficiency	-0.04		-0.04	0.07		0.07
Grade retention rate		-0.17	-0.11		0.24**	0.23***
Grade retention rate*proficiency		-0.02	-0.01		-0.11	-0.12
-2 Log L	14111.195	14253.499	14096.711	1364.608	1347.157	1345.193
n	4.293	4.293	4.293	4.293	4.293	4.293
N	11	11	11	11	11	11

Discussion and conclusion

In this article, we examined how the design of the secondary school system affects the formation of attitudes towards learning. Cross-national differences in the average readiness to learn of adults, as measured in PIAAC, suggest that strong external differentiation mechanisms, in particular tracking students at a young age and relying extensively on grade retention to deal with struggling students, lead to less positive attitudes towards learning. By contrast, the comprehensive secondary school systems of the Nordic countries seem to generate a more positive outlook on learning, particularly among those at the lower end of the educational achievement distribution. While such cross-sectional cross-country comparisons provide in themselves insufficient proof, as other differences between countries could also explain the observed patterns, further isolating the influence of secondary education by comparing learning attitudes among adults with attitudes collected in primary school (PIRLS, TIMSS) tends to confirm the negative effects of early tracking and grade retention on average attitudes. While our data do not allow to further disentangle the reasons for the observed association between educational system design and learning attitudes, our findings seem to be in line with earlier within-country studies which suggested that tracking practices may lead to feelings of frustration accumulating into an anti-school culture (Hargreaves (1967); Lacey (1971)) and that grade retention similarly causes aversion towards learning (Holmes and Matthews (1984); Jimerson (2001)). Given the strong relationship between learning attitudes and lifelong learning participation, this suggests that the design of the initial education system affects participation in adult education.

However, a number of questions remain to be answered. First, in the cross-sectional analysis including interactions with individual skill levels suggests that the external differentiation mechanisms affect in particular the learning attitudes among low-skilled respondents as expected. However, the estimated effects do not vanish completely for high-skilled respondents. Moreover, in the diff-in-diff-model some interactions, although far from significant, have opposite signs. This seems somewhat at odds with our expectations. For example, why would the grade retention rate in a country impact on the attitudes of high achievers, who are highly unlikely to have experienced grade retention themselves? There certainly could be some good explanations for these unexpected findings. For example, our diff-in-diff-models rest on the assumption that everything happening before age 10 can be 'controlled out'. However, treatments such as grade retention, even when they occur before age 10, could have cumulative effects reaching far into secondary education. Secondly, our matching strategy assumes that skill distributions do not change over time: weak performing adults were matched with weak performers from primary school. Indeed, early and adult skills are strongly interrelated (cf. Cunha and Heckman (2007); Heckman (2006), Bradbury, Corak, Waldfogel, and Washbrook (2011)). However, this relationship is not static; moreover, it could be argued that particularly learning attitudes could bias this identification (a positive attitude increases the

chance to 'climb up' the skill distribution) and that the extent to which the identification is distorted depends on the rigidity (and thus, the design) of the educational system. Finally, and most fundamentally, it could be argued that the design of secondary education is only one expression of a much broader perspective on education. For example, Räty and Snellman (1998) distinguish between inclusive and selective perspectives on education, with the external differentiation mechanisms primarily associated with the latter perspective. It could be argued that the dominant perspective also has an overall effect of learning attitudes, net of individual treatments, as this could affect the way students think about the goal and the meaning of learning.

However, alternatively, the lack of strong interaction effects may also suggest that unobserved country-specific factors still affect our estimations, questioning the validity of our approach. Moreover, the number of countries was small, in particular in the diff-in-diff-analyses, where only countries participating in both PIAAC and PIRLS/TIMSS could be used. This precluded making robust statistical estimations. Furthermore, data definitions from the various data sources were not identical: for example, while PIAAC collects data on general attitudes towards learning, PIRLS and TIMSS are more strictly tied to the school context (attitudes towards reading resp. mathematics). While we have tried to accommodate for these difficulties by using a range of comparisons and examining to which extent the findings were robust, the strength of the observed relationships indeed seemed to depend somewhat on the choice of the dataset and variable definition. In this sense, much more could be learned from longitudinal datasets, collecting information on learning attitudes and educational achievement over a longer time frame; such data are, unfortunately, very sparsely available on an international level.

Finally, we would like to conclude with a positive observation. Scholars such as Levin (2012) have recently expressed caution that, due to the rising importance of international assessments, education has been narrowed down to cognitive achievement, neglecting the value of interpersonal and intrapersonal skills and capabilities. A trade-off between investing in cognitive skills and nurturing positive learning attitudes can indeed be observed in primary education (cf. Boe, May, Barkanic, and Boruch (2004)): while on the individual level the relationship between skills and attitudes is positive, the correlation between the *country-average* skill level and the *country-average* learning attitudes is negative (for example, in PIRLS 2006, the correlation between both equals -0.27, in TIMSS 2007, it equals -0.47). However, fortunately, this trade-off seems to disappear when we consider learning attitudes among *adults*. In PIAAC, the correlation between country-average attitudes and country-average skills reduces to zero (-0.01). Moreover, a number of countries (Sweden, Finland) show that it is possible to generate positive outlooks on learning while scoring on the top of the cognitive performance ranking. Hence, for adults, there does not have to be a choice between delivering high-quality cognitive skills and generating positive dispositions about learning.

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CHAPTER 6 - CONCLUSION AND POLICY SUGGESTIONS

'Even a failure might bring some small ray of light or grain of knowledge' (Woolf (1937))

Overview of main research conclusions

In the four previous chapters, I discussed how the design of the educational system affects the outcomes of different groups of pupils on different time horizons. First, Chapter 2 suggested that early tracking increases the effect of social origin on reading achievement between primary and secondary education: countries that track pupils at an early age display stronger effects of social origin on individual achievement in secondary school, net of differences existing before the onset of tracking. In particular, early tracking seemed detrimental to the educational opportunities of socially disadvantaged students, while it did not seem to affect the achievement of their more advantaged peers[25]. Moreover, in an additional analysis, that has been accepted for publication in *Research in Comparative and International Education* (Lavrijsen and Nicaise (2016)), I considered the effect of tracking on students *at different levels of skill proficiency* (instead of the effect on students from different social backgrounds). These additional

[25] While these findings are in line with the overall account in the literature (see the overview in Chapter 2), a recent Dutch dissertation came to apparently opposite conclusions: Korthals (2015) observed the effect of social background to be lower in early tracking countries. This apparent contradiction could be explained by pointing out that the statistical analysis in Korthals (2015) controls for differences between schools: tracking thus is only estimated to lead to a smaller effect of social background *within* a certain school. However, note that in a tracked system school allocation is not random, but correlated with social background (and early ability). The larger the effect of social origin on school allocation, the smaller the expected social inequality *within* school: disadvantaged students who still make it into an upper track school have to be of very high ability, and accordingly can be expected to perform relatively well. Indeed, Korthals (2015) acknowledges that caution is warranted in interpreting the results of such three level models, because of possible selection issues. See also the discussion in Van de Werfhorst (2015b) and Bol, Witschge, Van de Werfhorst, and Dronkers (2014), who rightfully acknowledge that adding the school level changes the interpretation of their (negative) interaction between tracking and socio-economic background: '*we are not arguing that tracking decreases inequality in student achievement along socio-economic lines. Rather, our results show that the effect of tracking on the relationship between social class and student performance is due mainly to the placement of students in different schools*'. Hence, while adding a third level makes sense in order to disentangle the *mechanisms* behind the relationship between early tracking on social inequality, it is less informative when considering the total degree social inequity.

results showed consistently negative effects of early tracking on the group of low achievers, while the effect on the top performers was in all cases small and not statistically significant, with its sign depending on the subject domain[26]. Overall, the empirical evidence does not seem to point at any deadweight loss, in which equity is traded off against efficiency (Harberger (1964), Jacobs (2008)). In particular, the expected efficiency advantage of early tracking was not observed; as discussed above, Dupriez, Dumay, and Vause (2008) relate this to more flexible ways of dealing with student heterogeneity in the absence of rigid tracking, such as within-class differentiation and remedial education.

The most important message from Chapter 3 was that social inequalities in educational attainment are not only a result of the way the educational system functions, but also of socioeconomic inequalities outside the reach of schools. Surely, educational system design matters: a well-developed vocational education segment reduced school dropout as it offers valuable alternatives to less academically inclined students, while early tracking was again associated with a larger effect of parental background on the dropout risk. However, the strongest generator of social inequalities in school dropout came from outside the school system: children from low-educated parents were far more likely to drop out when poverty was high. This finding thus confirms an early concern by Boudon (1974) that *'the best strategy seems to lie (…) outside rather than inside schools, in social and economic change rather than in educational change; any lessening of stratification through a reduction of economic inequality is probably more likely to affect educational inequality than any other factor*'. Accordingly, this Chapter might serve as a warning not to exaggerate the capacity of the education system to affect social inequalities: as Wielemans (1991) called it, educational reform is '*a weak lever, which will break while trying to move the whole of society: social objectives of educational reform cannot be realised without strong and explicit backing from other important elements in society.'*

In Chapter 4, I zoomed in on the value of vocational education in the labour market. The empirical analysis confirmed that vocational education secures relatively safe pathways into employment[27].

[26] By dropping the reference to social background in this article, I could also use TIMSS, in which social background is not measured in detail, as the primary assessment, and thus consider the effect of tracking on mathematical achievement. Tracking seemed to have a small positive influence on the numeracy score of the top performers and a small negative effect on their literacy score. For the low performers, the effect of early tracking was always negative, but it was smaller in the numeracy assessments. It remains an issue for future research to explore to what extent this finding might be related to the particularities of the discipline itself. For example, one explanation could be that for a highly abstract subject such as mathematics the benefits of being taught in a homogeneous classroom are relatively more important. However, the data at hand do not allow us to test this idea, and alternative explanations – for example, data issues, in particular the lower comparability between what is tested in TIMSS and what is tested in PISA – cannot be excluded neither.

[27] Note that this (initial) value of vocational education on the labour market also has an implication for the relationship between educational system design and social inequity: when we use early labour market outcomes (instead of skill levels) as outcome measures, vocational oriented systems (including those with early

However, for older respondents vocational education seemed to lose some of its value relative to academically oriented programmes. This age pattern can be related to the lower versatility of vocational education, where less emphasis is put on the development of foundational skills such as literacy and numeracy; hence, when job requirements change over time (e.g. because of technological developments), a narrowly designed vocational education may not enable graduates to successfully adapt to changing labour market needs. Of course, this observation constitutes only one part of a broader evaluation of the advantages and disadvantages of orienting the educational system towards vocational skills; a much more elaborate account of this 'vocationalism', both in economic, educational, and social terms, can be found in Ryan (2003). Still, this trade-off between short-term benefits and long-term losses seems to underline the relevance of heavy investments in general skills also in (pre-)vocational tracks (cf. Van de Werfhorst (2014)), even if this adds to '*the key dilemma in the organisation of vocational education'* (Dronkers (2010)): how can vocational education become more general without losing its distinctive character?

Finally, Chapter 5 examined the extent to which cross-country differences in lifelong learning participation can be explained by differences in the design of the initial school system. Overall, cross-country differences in the attitudes towards learning of adults, particularly at the lower end of the educational achievement spectrum, seemed associated with early tracking and with an intensive use of grade retention. This observation could be interpreted as a long-term consequence of the differentiation/polarization hypothesis (Hargreaves (1967), Lacey (1971); Abraham (1989); Berends (1995); Ball (1981)), which postulates that a sharp differentiation between tracks creates a polarization between a dominantly pro-school culture in the advantaged tracks and a dominantly anti-school culture in the disadvantaged one. It also parallels observations on study engagement in secondary schools drawn from PISA (Borgonovi (2014)). However, this Chapter was surely the most inconclusive: the small sample sizes precluded robust statistical estimations, while the strength of the observed relationships depended on the way variables are operationalized. Hence, further research is needed for a more thorough understanding of how the educational system affects attitudes towards learning, paying particular attention to the potential distortion by unobserved country-level factors.

tracking) appear more socially equitable than the Anglo-Saxon general oriented systems (see Lavrijsen & Nicaise (2014a)).

From research conclusions to policy suggestions

Which recommendations for policy reform, in particular for the Flemish situation, can be drawn from these results? Here, I want to start with an introductory caveat: I am rather cautious about making bold claims of 'the' implications of my results, due to four considerations.

First, the incomplete nature of any cross-country comparison should be acknowledged. Cross-national research rests on the 'ceteris paribus' assumption: all other differences between countries are supposed to have been cancelled out. However, even though I have put ample effort in reducing as much as possible the bias due to possible confounders, such a perfect control is in reality out of reach. As argued by Merritt and Coombs (1977), '*no social science theory has even approached the goal of accounting for all of the variance in the dependent concept, and we shall have to be content with partial theories*'. Relatedly, the extent to which a *general* finding from a comparative analysis can be applied to a *specific* case remains to be seen. This may be particularly true for the Flemish education system, which represents a singularity in comparative regard because of a number of rather unique characteristics (Eurydice (2012)): for example, the Flemish freedom of education (both in terms of the quasi unlimited freedom in school choice and the high involvement of privately managed actors in school governance) is absolutely remarkable in an international comparison, with only the Netherlands (and the other Belgian regions) coming close. This small grip of public government may have consequences for the management of educational reforms.

Secondly, as we saw in Chapter 1, educational systems are no abstract manifestations of a limited number of system characteristics, but are shaped by deep historical roots, which have led to the clustering of educational systems and other social phenomena into more or less stable 'regimes'. Within these regimes, path dependencies limit the possibility of reform; indeed, in their explanation for the relative absence of convergence between educational systems, Green, Leney, and Wolf (1999) note that common challenges usually have not led to common answers. Educational structures may simply be less manageable than statistical modelling would assume, as the broader context can not simply be 'controlled out' but instead may affect the implementation of the reform. To quote Tyack and Tobin (1994), '*reformers believe that their innovations will change schools, but it is important to recognize that schools change reforms*'. The question thus remains to what extent the typical approach of comparative education proposed by Noah (1973) – to replace the name of countries by the names of variables – yields equally valid policy recommendations. Instead, researchers should anticipate that reforms may have undesirable consequences (Noah & Eckstein (1998)) and thus be modest regarding their ability to make strong claims (Noah (1984)). To quote Derouet, Mangez, and Benadusi (2015), '*it is clearly not sufficient to know what should be done in order for things to happen. These systems result from multiple, very complex*

interdependences whose effects are difficult to predict. It is a simple truth, but hard to accept: the world of schooling – and, beyond it, the social world – evolve and change without anyone or anything really being able to foresee, still less decide, these evolutions and changes.'

Thirdly, I have framed educational system design in this dissertation as a permanent tension between the opposing requirements of differentiation and integration (see Chapter 1). Educational system design thus represents a 'wicked problem' (Rittel and Webber (1973)), i.e. a policy problem that is difficult to solve because of contradictory requirements and complex interdependencies, in which a solution to one aspect of the problem may only create a new one. For such a wicked problem, there is thus no ultimate solution, only a permanent search for an acceptable balance (cf. Green, Green, and Pensiero (2015); Van de Werfhorst, Elffers, and Karsten (2015)). In this case, it could be argued that gradual reforms are preferable over more radical interventions (Rothenberg, Mcdermott, and Martin (1998)); for example, Streeck & Thelen (2005) argue that incremental processes such as layering (introducing small new elements) and conversion (doing something new with the existing structure) have the potential to gradually shift regimes to new equilibria.

Finally, while I evidently focused on *differences* between countries, Western countries are in fact to a large extent *similar*, in particular when compared to alternative educational models that existed in the past. For example, all Western countries offer today universal access to secondary education in a more or less meritocratic context[28]. This 'international isomorphism' (Meyer, Ramirez, Rubinson, and Boli-Bennett (1977)) does of course not mean that the remaining system design differences would not matter any longer, but it surely calls for some modesty in the expectations about policy reform. Relatedly, while international comparisons often rely on relatively crude categorizations of nation-specific educational practices - for example, by operationalizing tracking in terms of the age of first selection – while national differences may often be more subtle (Novak (1977)).

In sum, instead of formulating bold 'way forwards', the role of policy recommendations would shift rather towards offering inspiration and assistance: at least, they should indicate why some policy changes seem more attractive than others. To quote Husen (1975): *'there are no clear-cut relationships between research findings and policy-making that would make it just a matter of applying the results of pure research in order to arrive at the right decisions. What I consider to be a proper and realistic role for the*

[28] Similarly, D'hoker and Henkens (2005) stress that the current Flemish educational system is already strongly integrated when compared to how it functioned in the past. Surely, vocational, technical and general tracks are today still segmented from each other. However, this segmentation is far less sharp than it was in the first half of the 20th century, when general education and vocational training were completed independent institutions, which were even governed by different government administrations. Similarly, even while comprehensive experiments did not work out, the compromise structure they give birth to has retained some of its elements, such as the formal common core in the first two years of secondary education.

researcher vis-à-vis the policy-maker is that he can provide some assistance in posing problems (…) and that he can assist in providing more enlightened interpretation of findings. In general terms, then, the researcher can contribute to a broadening of the facts, perspectives and viewpoints on which the policy-maker has to base his decisions.'

Policy suggestions

According to international judgments (cf. OECD (2013b), OECD (2014a)), the Flemish system is performing relatively well on average. However, it also suffers from relatively high social inequalities (Lavrijsen and Nicaise (2014b)): while students are not necessarily performing poorly in absolute terms (Lavrijsen and Nicaise (2014c)), there are wide gaps in performance between schools and between socio-economic and ethnic groups, and there are concerns about the academic performance and the study involvement of students in vocational schools (Kis (2010), OECD (2013a), Steunpunt Toetsontwikkeling en Peilingen (2014)). The findings in this dissertation suggest that these disadvantages could be related to the structure of the Flemish system[29], as early tracking was shown to increase social inequalities in reading achievement (Chapter 2), to strenghten the link between parental background and school dropout (Chapter 3), and to generate less positive attitudes towards learning (Chapter 5). Similar findings have also resulted from other recent research projects, in particular from the Dutch research program on educational system design (see Van de Werfhorst, Elffers, and Karsten (2015)). Recently, an educational policy plan (Masterplan) has been agreed with the explicit aim to strengthen the orientation function of the first two years of secondary education. However, as we will argue, the success of this reform will depend on its implementation, which today is still far from clear. In this paragraph, I will formulate four suggestions which, to my opinion, could further enhance the performance of the educational system.

The common thread troughout all four suggestions is the Model of School Learning, developed by Carroll (1963) and revised by Carroll (1989). In this Model, successful learning results from the balance between two factors: first, the time needed to learn, which is dependent on the aptitude and motivation of the individual student, and secondly, his opportunity to learn, which is dependent on the time spent on the content and on the quality of the instruction. According to this model, the problem with early tracking is

[29] In the Flemish educational system, general, technical, vocational and arts tracks start at age 14. In the first two years of secondary education, only a B-stream catering for students who did not reach the targets of primary education, is formally separated from an A-stream. However, already at age 12 electives have to be chosen (e.g. Latin or technics) which strongly restrict the choice to be made at age 14. Moreover, secondary schools often offer only a limited number of tracks after age 14, making secondary school choice at age 12 already strongly indicative for future track choice.

not so much differentiation in itself; Carroll (1989) indeed emphasizes that '*equality of opportunity also means pushing all students' potentialities as far as possible toward their upper limits; students with different amounts and kinds of aptitude need to have educational programmes that differ in pace and content*'. As we noted in this dissertation as well, some kind of differentiation may be fruitful for the functioning of the educational system: for example, strong vocational tracks (at the upper secondary level) may help to reduce school dropout (Chapter 3) and may smoothen the transition to the labour market, in particular for disadvantaged students (Chapter 4). More fundamentally, educational systems will always have to find a balance between the opposing requirements of differentiation and integration (Chapter 1).

However, both our own work and the Model of School Learning suggest a number of malfunctions related to the way tracking is currently implemented in the Flemish educational structure.

First, Carroll (1989) postulates that in particular for weaker students, the '*opportunity to learn is usually less than that required in view of the student's aptitude*'. Indeed, the current implementation of the optional hours (electives) at the start of secondary education seems to reduce the opportunities to learn for weaker students, instead of increasing them. This point will be further elaborated in Suggestion 1.

Secondly, Carroll (1989) stresses that tracked structures should implement some form of a '*continual reassessment of potentialities, with corresponding adjustments in educational programmes'*. By contrast, the Flemish structure is relatively rigid, with track mobility only pointing downwards. This point will be elaborated in Suggestion 2.

Thirdly, Carroll (1989) emphasizes the importance of objective testing to determine track allocation: *'Assessing students' potentialities implies that every available means, including carefully devised psychological and educational tests, should be used to estimate, at least provisionally, what each student's potentialities may be.*' By contrast, the Flemish educational system today lacks an objective mechanism to determine track placement, increasing the weight of parental preference, potentially reducing both its efficiency and its equity. This point will be elaborated in Suggestion 3.

Finally, Carroll (1989) suggests that the opportunity to learn is not only dependent on the time available to learn, but also on the quality of the instruction. However, in Flanders, educational resources, such as having experienced teachers, are often underdistributed to disadvantaged schools. This point will be elaborated in Suggestion 4.

Suggestion 1: increase the opportunity to learn, in particular for weaker students

In the current educational structure, students who opt for a technical option or for the pre-vocational course (*beroepsvoorbereidend leerjaar)* receive far less opportunities to learn core general skills and knowledge (such as languages or mathematics) then their peers in the academic options. For example, in the second year of secondary education, each week between 7 and 14 learning hours are used for the provision of occupation-specific skills. Given the importance of a strong core of basic general skills for later functioning in society (OECD (2013a))[30], it could be questioned whether part of this learning time could not be recuperated for general-cognitive (possibly remedial) courses. An interesting indication for the possible value of such a redirection of learning time towards general-cognitive content, in particular for the weaker students, comes from the longitudinal research project LOSO. Controlling for previous performance test scores, Van Damme (1997) indeed showed that students who received more hours in mathematics during the first year of secondary education indeed performed better on a mathematical test at the end of the year. Van Damme (1997) thus suggested that a differentiation in learning time – in which weaker students receive more opportunities to learn, not less – could help to remedy earlier disadvantages, which would also allow for a more positive study choice orientation later on (i.e. an orientation which takes interests and talents more into account, instead of primarily channeling low academic performers into technical or vocational training). Similarly, international evidence has suggested that part of the gap in mathematical proficiency between weak and strong students can be explained by differences in exposure to mathematical content (Schmidt, Burroughs, Zoido, and Houang (2015)).

Hence, a first improvement to be made to the Masterplan would be to make sure that when the content of the optional hours in the first two years of secondary education is redefined, this should in particular increase the opportunity to learn for those currently in the technical options and in the B-stream. A possible approach has already been proposed by Van Damme (2009), who suggested that students in the first two years of secondary education should only be allowed to take electives (such as technical courses) *after* a high level for all basic subjects has been realised. In order to increase the number of students able to achieve these high norms, additional support and remedial classes would be the priority in these first years of secondary education, instead of electives.

A popular counterargument is that, at the start of secondary education, some students simply 'prefer' manual work over general courses. However, together with Furedi (2010), we would maintain here that

[30] Note that Chapter 4 shows that even in terms of labour market preparation, general skills are of high relevance in the longer run.

curriculum design should not primarily be about satisfying individual preferences, but rather about what is deemed necessary for functioning in society.

Note that, unfortunately, educational reforms have often been associated with *lowering* the exposure to academic content (Henkens (2004)). For example, the comprehensive structures implemented in the (anti-authoritarian) 1960s were often associated with progressivist educational philosophies and child-centered teaching methods (Bellaby (1977)), such as pupil-driven instruction and self-directed learning; at its most extreme, the reliance on pupils to take charge of their own learning led to a rejection of institutionalized education altogether (Illich (1971)). Moreover, the influx of working class children often led to a shift in the curriculum towards the 'real' world (cf. the curriculum introduced in Sweden in 1969, as discussed by Harnqvist (1989)). As summarized by Hattie (2008), this in the end led to a reduced exposure to challenging contents, and to declining support for the educational reform (Derouet, Mangez, and Benadusi (2015)). However, the correspondance between educational reforms and lower exposure is no historical necessity; for example, in Finland traditional teaching methods continued to dominate, also after the comprehensivation of secondary education (Simola (2005)). Heller Sahlgren (2015) argues that it is precisely this reliance on traditional methods that might explain Finland's excellent performance in international test assessments.

Suggestion 2: make track placement less rigid

Secondly, tracking in Flanders is relatively rigid: once in a 'lower' track, it is very difficult to move to a 'higher' track over the course secondary education. In fact, the only way to correct for a possible misallocation at the start of secondary (upwards) is when the student enters tertiary education – in principle, access to tertiary education is open to everyone. However, this of course often comes too late, with very limited success rates for those entering tertiary education from a vocational track.

Dustmann, Puhani, and Schönberg (2014) argue that increasing the permeability of tracked educational systems would reduce the inequity in outcomes, as it would allow misallocated students to correct this allocation more swiftly. Similarly, Krause and Schueller (2014) argue that an increased permeability would in particular be beneficial for students from disadvantaged social backgrounds, while also immigrant youngsters have been shown to often make use of such 'upgrading' routes to achieve a high educational attainment (Crul (2013)).

Inspiration for system adaptations could come from the Netherlands, where the possibility to promote to higher tracks has been part of the educational system for a long time (although possibilities have been reduced recently): students from the havo- or vmbo-tracks were allowed to transfer into a higher track

after meeting certain requirements regarding their academic performance. Van de Werfhorst (2014) claims that this mechanism could help to explain the relatively low social inequality observed in the Netherlands, when compared to other early tracking countries.

Interestingly, in the Netherlands tracks have been shown to be more permeable when they are located in multi-track schools: students are more inclined to promote to a higher track when these tracks are offered in their own school (Inspectie van het Onderwijs (2014)). In Flanders, the Masterplan also proposes to increase the integration between different tracks by promoting schools structured according to content domain (*domeinscholen*) instead of academic level. Hence, by grouping different tracks in the same school, a smart restructuring of the school landscape could increase the possibilities of track mobility[31]. Moreover, note that track mobility would of course also benefit from increasing the exposure of weaker students to academic content in the first years of secondary education, as proposed in Suggestion 1, as this could serve to keep the gap with the academic tracks more manageable.

Suggestion 3: make track allocation more objective

Today, most countries rely on some form of external examination to determine track placement, at least partially (Eurydice (2012)). In Flanders, however, such an objective mechanism does not exist: tracks are formally open to everyone, although, of course, previous achievement, parental preferences and teacher recommendations all affect which options are considered appropriate. This combination is in fact rather peculiar: the highly selective nature of the Flemish school system makes a correct allocating of students all the more important, but the 'rules' for this allocation remain somewhat ambiguous[32].

As explained above, correct allocations are of course important from an efficiency perspective, as they adjust track populations to track expectations. However, even a stronger case could be made from a social equity perspective. According to Boudon (1974), two students at a similar level of academic performance could end up in different tracks simply due to differences in parental preference: parents

[31] Moreover, in multilateral schools integration between tracks could be fostered by tracking classes only for those subjects that heavily rely on cognitive differentiation (such as mathematics), while leaving classrooms untracked for subjects in which the focus is more on integration (e.g. social science, physical education), as proposed by Van de Werfhorst (2014).

[32] Today, giving more weight to objective tests is currently proposed primarily regarding the access to *tertiary* education (Fonteyne et al. (2015)). However, track placement at the start of *secondary* education has consequences that are at least as far-reaching.

from higher social origin on average prefer more prestiguous tracks, net of student ability (Checchi and Flabbi (2007), Boone and Van Houtte (2013a)).

In the absence of an objective track allocation mechanism, parents will thus have a larger influence on track choice, and social inequality will rise. A first option to reduce parental preference could be to increase the weight given to teacher recommendations, as this reduces parental freedom of choice. Dollmann (2011) indeed shows that a German policy change that made teacher recommendations binding reduced the social bias in track placement. However, teachers recommendations still may be socially biased (Boone and Van Houtte (2013b)). Objective external assessments, such as central exams, may then be a way to further circumvent social bias in track allocation. For example, Card and Giuliano (2015) show that the introduction of external tests to determine entrance into top-level educational programmes in the US increased entrance of socially disadvantaged students. Similarly, Timmermans, Kuyper, and Werf (2015)) show that reducing the weight given to objectively assessed academic performance scores (CITO) in the Netherlands, in favour of teacher recommendations, is working against socially disadvantaged students. More objective ways to determine track placement could thus counterbalance the biases inherent in parental preference and teacher recommendations.

Relatedly, it has been argued that external assessments could raise academic achievement, particularly in lower tracks, as it makes schools accountable for the performance of students in all tracks. Bol, Witschge, Van de Werfhorst, and Dronkers (2014) shows that, in particular in early tracking countries, a reliance on external examinations reduces the effect of social background on academic achievement.

Again, educational reformers have often been reluctant towards external examination because of fears that this would emphasize the selective function of education or because it would narrow down the purpose of education to testable skills (cf. Standaert (2014)). However, as Dronkers (2010) argues, '*leaving this socially inevitable selection to the labour market instead of the educational system creates the chance that social inequality between students from different strata will become even greater than the inequality that exists within education. After all, selection is even less universalistic (meaning the same criteria apply to everyone) on the labour market than it is in education.*' Indeed, when education would cease to play its role as the dominant allocation mechanism, other mechanisms would fill its place, and in all probability this would reduce, not increase social mobility. For example, Maurin and McNally (2008) show how the lowering of thresholds due to the abandonment of normal examination procedures at the French universities during the turmoil of May 1968, effectively reduced social mobility for the cohort involved, as higher class students seemed to have benefited more from the lowering of norms.

Suggestion 4: enhance equity in resources distribution

Finally, educational resources are often unequally distributed across tracks (Darling-Hammond (1995)). For example, OECD (2014b) indicates that schools with higher proportions of students from socio-economically disadvantaged homes tend to be more likely to report shortages of resources, such as instructional materials.

In particular, it has been shown that the more experienced and more capable teachers are often assigned to higher tracks in advantaged schools (Burns and Darling-Hammond (2014)). An important finding in this regard is the observation by the OECD (2014b), which considered the relationship between the social composition of the school and the average number of years of experience of its teachers. Among all participating countries in TALIS, this relationship was the strongest in Flanders: teachers with less than 5 years teaching experience were heavily overrepresented in schools where more than 30% of the students were from a socio-economically disadvantaged homes.

Hence, Krause and Schueller (2014) defend to provide in particular lower tracks with more support, for example, by increasing teacher pay or earmarking funding for remedial instruction. Indeed, additional teacher payment for teaching disadvantaged students has been associated with higher achievement growth (Goos, Van Damme, Onghena, Petry, and de Bilde (2013)).

Challenges for further research

In an overview of the state of the research field, Van de Werfhorst (2015b) identifies a number of current developments in comparative research on educational system design. A first important development is the shift from short term to longer term outcomes; a second one is the development and application of a broader set of statistical techniques to deal with the cross-sectional nature of most available datasets, such as differences-in-differences (which, until recently, has been mostly used only to estimate average effects). This dissertation fits seamlessly in both developments: Chapters 2 and 5 apply diff-in-diff- and pseudo-panel-techniques to the issue of social inequalities and learning attitudes, while Chapters 3, 4 and 5 consider the effect of system design on longer term outcomes (graduation probabilities, labour market careers, lifelong learning).

However, Van de Werfhorst (2015b) also identifies some remaining challenges for future research. Three of these challenges certainly apply to the shortcomings of this dissertation as well.

First, he notes that while research has often evaluated differences between system designs, much remains to be known on how measures within a system could compensate for its weaknesses (cf. the suggestions in the previous paragraph).

Secondly, I have already repeatedly mentioned the restrictions imposed by the cross-sectional nature of most available international datasets regarding effects of education. While the diff-in-diff-approach partly accommodates for this, longitudinal data could enhance our understanding of social equity effects as they allow to distinguish more accurately between the effects of ability, social origin, and educational careers. Similarly, repeated measurements could allow to identify more accurately the interplay between educational systems and related spheres; for example, to study the bidirectional influences between school dropout and youth unemployment. While collecting international longitudinal data is out of reach of individual researchers, further research could further develop the statistical techniques mentioned above and/or use national collected longitudinal data, acknowledging that both approaches generate informative but incomplete results.

Finally, this dissertation covers only two of the three important functions usually attributed to educational systems[33], in particular the generation of knowledge and skills on one hand and labour market preparation on the other. The third function of the educational system, developing civic attitudes and socializing youngsters into active participants in society, has been mostly left out of this dissertation. At a time where conflicts about citizenship and socialization seem to become all the more pressing – this dissertation was finalized in the aftermath of the terrorist attacks in Paris and Brussels – the relationship between system design and civic outcomes gains in importance. For example, the intriguing[34] work by Crul, Schneider & Lelie (2013) shows how educational systems may affect acceptance of western values among second-generation immigrants. There are indeed indications that countries with a heavily differentiated systems perform less well in promoting active citizenship among their students, in particular at the lower end of the achievement spectrum (Netjes, Werfhorst, Karsten, and Bol (2011); Kavadias (2014); Van de Werfhorst (2015a))[35]; hence, Van de Werfhorst (2014) postulates that '*the educational structure of a stratified educational system, with its early selection and strong vocational orientation, is ill-suited to provide the same kind of citizenship education to all of its younger citizens.*

[33] Van de Werfhorst (2014) distinguishes 'promoting social equity' as a fourth function. However, social equity can be regarded as an aspect of the three other functions, i.e. the extent to which social origin affects each of the three outcomes (skills, labour market outcomes, citizenship).

[34] One of the intriguing aspects of this work is that it constructs a quasi-experimental design by comparing attitudes among children from immigrants from a single region who had been quasi-randomly distributed across European arrival countries.

[35] For Flanders, a recent (non-academic) survey finds a similar lack of knowledge about climate change among students in the vocational tracks (OVDS (2015)).

Youngsters come to develop their identity and personality during early adolescence, and it is precisely at this stage that students are separated into different classes and school buildings, largely on the basis of cognitive achievements'. If, as H.G. Wells somewhat dramatically put it in 1925, '*civilization is a race between education and catastrophe*', the issue of civic engagement and democratic participation, and the relationship with the design of the educational system, certainly will deserve additional attention in the future.

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